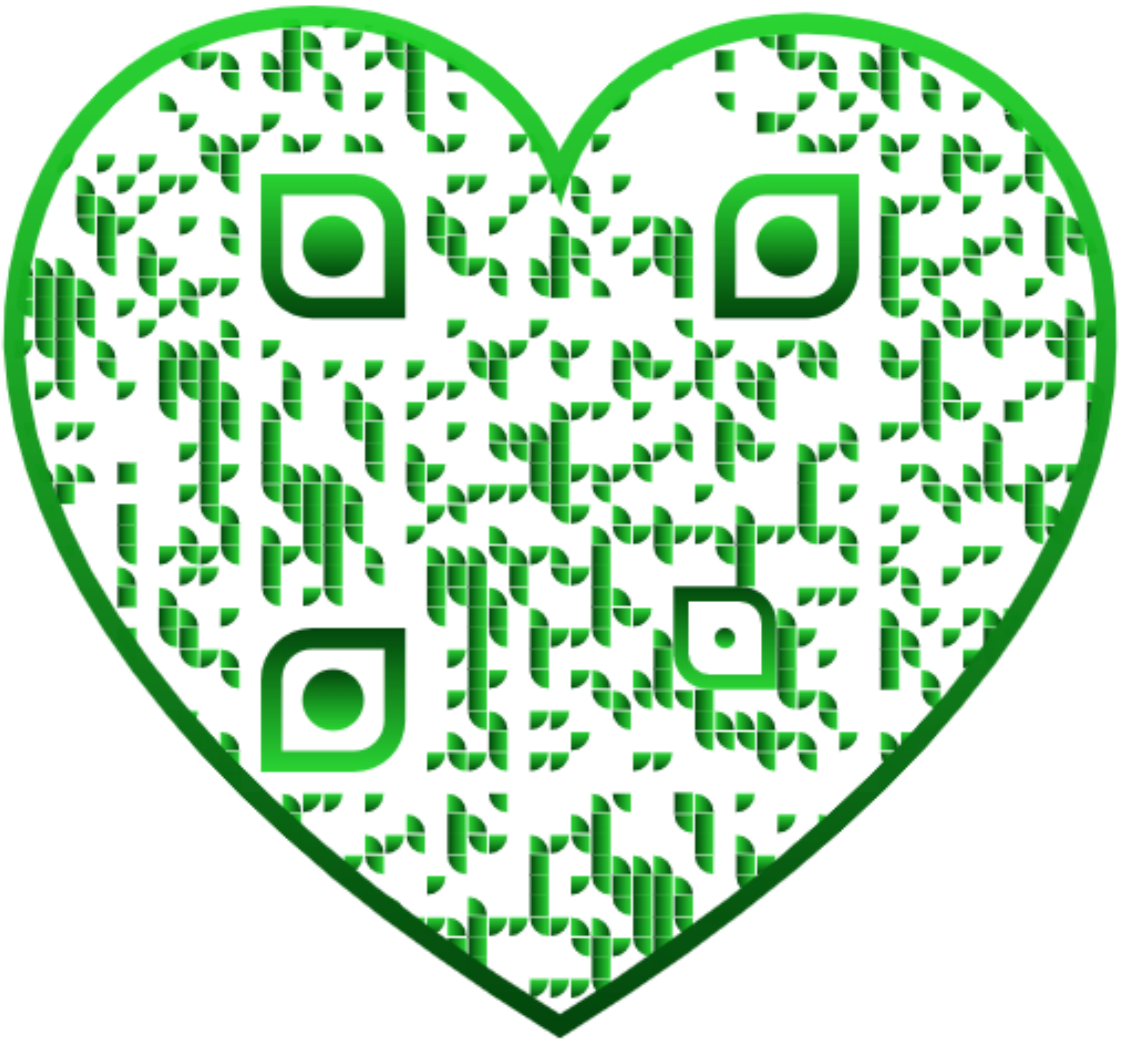
The Hollow Earth

F. T. IVES



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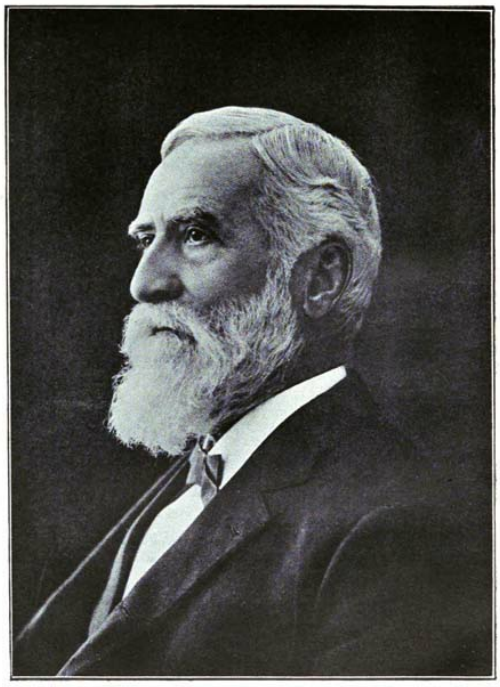

F. T. Ives.

I.
CRANKS.

Cranks are appliances to turn things round.

A Crank that revolves only half way will not always accomplish much of a change, and in many cases would only aggravate the situation. Were it not for Cranks nearly all mechanical appliances would be motionless.

Men's thoughts and opinions would all be the same, without some such device to get them out of the old notions, grooves and ruts in which they long have indulged and plodded. The world has known Cranks ever since our first parents adopted the wearing of fig leaves, and Noah took up ship building on the weather bureau suggesting cloudy weather and showers in Eastern Turkey. Moses was a Crank when he forbid the eating of pork, salt water eels, turkey buzzards, owls and all other unclean birds, fish or animals of any kind, but there is no doubt that these commands were none of his mistakes.

Sacred writ gives a plenty of such characters, but, by skipping to times more recent, we find such Cranks as Copernicus, Galileo, Columbus, Newton, Franklin, and, during the last century, the Crank family has greatly increased with Daguerre, Watt, Howe, Edison, Marconi and Tesla and scores of others, who, in some of the earlier times, would have been hung or burned as wizards and sorcerers.

Political, historical and religious Cranks have sprung up, turning over and upsetting many old-fogey and absurd notions and beliefs of the past.

In former times Cranks were the subject of ridicule and persecution for trying to inject some new ideas into the public mind. History is profuse with abuses of some of the best thoughts and discoveries that have come to the human race.

Supposing Copernicus had never advanced and enforced a conclusion that the Earth was round and revolved on its axis, such motion causing the apparent rising and setting of the Sun. Only for this we might to this day believe in the story of Joshua's command over the sun and moon, and associate believers

with Parson Jasper that “De sun do move.” It is pleasant to realize that we are living in a time when new thoughts do not frighten people, and we are not scared at what we cannot understand, even if it does not harmonize with antiquated ideas purporting to be 4,000 to 6,000 years old.

The humble and obscure individual who presumes to offer the few succeeding pages of crude ideas may be classed among pigmy Cranks, but, nevertheless, feels impelled to sow a little thoughtful seed on a subject that, to his knowledge, has never been discussed; and with a hope that such seed may some of it fall in good ground, and spring up a crop of criticism that may ultimate in some better mind taking it up and demonstrate with the success that the writer believes it merits.

To prove that the Earth was round required a long time and a serious amount of persecution. Now, to assume that it is hollow, may require more time than the brief discussion in this small book. Yet it is hoped the ideas here may take root in the enlightenment of the present day and start a growth productive of good fruit in the future. In order to discuss this question involves a task that in the outset may look discouraging, as follows:

The ax must be laid at the root of many favorite and long accepted beliefs laid down by scientific authorities to explain the principal phenomena of disturbances on and in the Mother Earth, and to overthrow nearly all accepted theories on the following subjects:

The assumption that the Earth is intensely hot or in a molten state in its interior;
The presumption that it is a solid ball;
The supposition that there is an actual pole;
That hills and mountains are always results of volcanoes;
That volcanoes are a prime or natural existence;
That living springs and lakes are results of surface influence;
The theories of the Gulf Stream;
Icebergs and the Ice belt, their formation;
Glaciers, how formed;
Equable condition of the Mediterranean Sea;
And the Law of Attraction of Gravitation,
Or that the Sun is a mass of heat.

II.
FIRE AND WATER.

The two elements of fire and water are evidently the source of all created things.

It is the purpose in this plain and homely dissertation to review and criticise some theories set forth by scientists, and to introduce some new ones more acceptable to the mind of the writer, and to be submitted to observing minds to decide upon their merit.

It is a generally believed assertion that the Earth has been a molten mass at or near its origin, except from the rather doubtful story of creation related in first chapter of Genesis, where it appears that the spirit of God moved upon the face of the waters. When or how they were created, the story fails to relate. But, admitting the waters to prevail to such an extent as to incline God's spirit for a voyage thereon, would make the idea of a molten Earth rather improbable.

The Earth is said to be undergoing a cooling process for the past thousands of years, but at some remote time in the past it was covered with ice and traversed by glaciers.

There are various explanations of the phenomena of icebergs, glaciers, volcanoes, the Gulf Stream, and why the Mediterranean Sea does not fill up or change its conditions through the thousands of years known to history. The philosophy of earthquakes, volcanic eruptions, increase of heat in digging deep in the earth, artesian wells, springs and lakes, all have various solutions for being as they are, but this discussion proposes to throw into the waste-basket nearly all of the accepted conclusions on the subject, and, in order to go to an extreme limit of Crankism, will dispute the law of Attraction of Gravitation. To dispute the long accepted conclusions on most of these topics would be presumptuous without an effort to give good and sufficient reason for such skepticism.

The first element to consider will be fire, or heat, without which, it seems

safe to assert, nothing can be produced from the Earth, or by the devices of man. To draw a base line to work from, we will begin at the polar center of the Earth's motion. The Earth, unlike any other object that perpetually revolves that we see or know of, does not have a shaft, or axle, or anything to create friction, and, therefore, heat. There is but one word in the English language that tells what will produce heat; that is friction, which may claim motion for its parentage. Now, this proposition is offered for a starting point. All heat is produced by friction, in the absence of which there can be no heat. This claim made, and presumably well established, how can there be any central heat of the Earth, revolving on nothing but an imaginary center? Will any scientist explain at what point heat begins to generate? It would appear as difficult as to accurately fix the point where moral responsibility commences in a child, or just when the wheel of time will cease to revolve. At whatever point heat begins, is it supposable that it works internally or outward? Any observing mind can give but one answer.

It is claimed, to prove the molten condition of the Earth's interior, that the various borings for artesian wells and diggings in mines show a uniform increase of heat as greater depths are attained. All these ratios of increase differ somewhat in different localities, but not enough to have ever banished the idea that at a few thousand feet of depth everything would be a liquid mass. This idea ought to be absurd enough to make a brazen image smile.

Let us consider what these explorations into the bowels of the Earth amount to. The deepest holes bored or dug are, without exception, less than a mile deep. Admitting a mile, that is 1-4000 of the distance toward the center. Imagine a puncture on an orange, or on a ball eight inches in diameter being four inches to the center. Is there any man living could see a hole as small in proportion to its size to 1-4000 of one-half of its diameter? How insignificant such a test. Reasons for this delusion will be given later on, under treatment of Volcanoes.

Again, the Earth's surface is covered with at least four-fifths water at depths ranging from one to five miles, including the millions of springs, lakes and rivers on land, to say nothing of the inexhaustible quantities of water encountered in the aforesaid boring and mining operations.

The deepest explorations in mines are the salt mines of Poland, the Calumet and Hecla copper mines and Comstock Lode. These have all been on trail of

some mineral deposit formed by some remote work of Nature in the undefinable past, when volcanic or other influences in Nature's laboratory left their deposit. These are the only places that man has explored, only insignificant depths, and formed extravagant conclusions of the rest of the way.

But let us go back to the oceans, with their great depths and extended areas, and what do we find? It is this: Whether on the Equator or on the coasts of Greenland, in the tropics or frigid latitudes the same, that at the deepest sea soundings the temperature is near or below the freezing point, being literally liquid ice. These temperatures are at depths of five times as deep as anybody has bored or dug, and cover four-fifths of the Earth's surface, and, instead of being hot, or even warm, are extremely cold.

If the internal heat is as great as is claimed, it ought to be enough to set every drop of water in the oceans into a boiling condition inside of fifteen minutes, but there does not seem to be heat enough to warm the bottom of the kettle.

It is assumed that the earth originated in a nebulous form, or an aggregation of small starry bodies, or something else which nobody has as yet explained clearly.

It is evident that our Earth has come into its present form through a vast amount of time and changes, and is made up largely of liquids and plastic substances, which must have had an existence in its origin. There is little doubt but that all its composition has been revolving through space in some form for countless millions of years with its mixtures of liquid, gaseous and solid constituents.

It does not need a long argument to demonstrate that bodies in such revolutions as the earth is making have a tendency, by centrifugal force, to throw the heavier elements to the outside, and as this seems to be a universal law in all scientific experiments by man, it seems reasonable to suppose the earth's centrifugal forces are no exception in their results. Such being the case, leads at once to the supposition and probability that the Earth is a hollow globe, and not a solid mass, with points of actual poles at each end that can be explored.

As water is, and has been in all history we know of, so large a part of the earth's mass, the object of this writing is to show the wonderful influence it

exerts in the world's affairs, and the ample provision Nature has in store, and where it is stored, for man, and animals, and vegetation to bank on.

But, in passing, it is just that a name for many recent years that has been a subject for ridicule should be noticed with profound respect for his wise and superior observations. This man for whom I wish to speak a word of commendation and admiration is Captain John Cleves Symmes, who I am prepared to allow the honor of first advancing the theory that the Earth is hollow, and has been held up as the authority for finding "Symmes's Hole." While the present writer had never seen or read any of his arguments for such a hole, the idea came originally, as if never thought of by my worthy predecessor. To avoid any charge of plagiarism, this topic will, therefore, be treated as if never before thought of.

Assuming that the Earth is hollow, the purpose will be in the following pages to show how and why, and the great importance to the inhabitants of the outside that it should be so. The first proposition is, therefore, a hollow Earth from causes heretofore named by centrifugal force; next, that the inside is an ocean of fresh water, with continents of land, and the outside oceans of salt water and its continents, as we have partially learned of them.

That the ice belts in each frigid zone are the dividing lines between salt and fresh water. That openings at the approach to either pole are at least 1,500 miles across, and that a magnetic compass above a latitude of eighty to eighty-eight degrees will not keep its natural position at any point within such latitude, but will, in its endeavor to point the needle to the true center of motion, lift up the point in order to keep the right bearing, or show some other embarrassment or irregularity. Whoever explores at these latitudes is, instead of going in a course directly to the center of motion, unconsciously rounding a circle toward the inside.

The flattened condition of the Earth at the poles goes to accommodate both the claims of being hollow and how it came to be so.

We are informed that every raindrop is hollow falling through a short amount of space, and how more reasonable to suppose the Earth's great mass to be so, revolving in an eternity of space.

It is more than presumable to suppose that every planetary body in the universe is hollow, and made so by the same fixed law for all flexible bodies

in revolution to become hollow. Are not the rings of Saturn thus produced?

Here is a planet they tell us is seven hundred times as large as the Earth, but its density only ninety times as great. His mean diameter about 70,000 miles and compression one-tenth, so that the polar diameter is 3,500 miles less, and the equatorial 3,500 miles more than its mean, thus duplicating largely the shape and globular form of the Earth. Is it not reasonable, then, to suppose that the lack of density has allowed its revolutions to produce its series of rings, those most dense being outside? And the whole order being such, that our position allows us to look through them instead of on to an outside surface?

Jupiter has the same characteristics in diameters. The mean, 85,000 miles; equatorial, 87,800; polar, 82,200, a difference of 5,600 miles, which means the same influences and same reason to make it hollow. While 1,233 times as large as the Earth, its density of substance is only 301 times as much. Here we have the two largest planets, perhaps yet in their period of development for being inhabited, in very like form relatively as the Earth.

It may not be ill-timed to assert at this point the belief that all planetary bodies are hollow and cool, not one in a molten condition or giving out heat, but only generating heat in their own atmospheres, thus giving out light, which we, in our ignorance, attribute to a mass of intense heat or a globe in combustion. Such a condition seems unreasonable to exist in a body traveling unlimited space, which is cold beyond any degree of ascertaining. The sun is subject to the same conditions as the Earth, as far as obtaining heat, and this work will claim that we receive no more direct heat from the Sun than from Mars or Venus.

Taking the first proposition, that in the absence of friction there can be no heat or light, the assumption is that the Sun generates its heat and light by its wonderful revolution in its own atmosphere. With a diameter of 860,000 miles, and revolving in 25.38 days, the Sun is moving through its atmosphere a mile in eight-tenths of a second, and seventy-five miles a minute, and 4,500 per hour.

With an atmosphere of relative density of the Earth’s, it is easy to see what a pyrotechnical and electrical display this would reveal to the lens of a telescope, giving the impression of fire on an inconceivable magnitude. It

seems unreasonable that in the realm of Nature anything, or that anywhere fuel can be found for an eternal fire except in an old orthodox Hell.

To an observer on Mars or Venus, the earth would, no doubt, present the same starlike appearance that those planets do to our earthly eyes.

The electrical sparks on a trolley wire or dynamo give the same expression to our eyes, though in miniature, with no consciousness of heat to our feelings.

It is doubtful if, with all the observations of the Sun by telescopes, we have gained any knowledge of its structure, but only of its revolutions, size and movements, the same as the Earth. It would be a very difficult subject to diagnose clearly as to its productions of animal and vegetable life. The electrical influences through an atmosphere proportionally deep with ours, with its clouds that must exist in the same, could very thoroughly obscure the surface of the Sun. Unless at special intervals, when certain exposures would be called Sun-spots, either on a great space of continent or ocean.

The great flames of gases in the atmosphere would give the impression, by telescopic view, of a burning mass, when under these atmospheric flames all is cool and calm.

In the writer's mind there is no doubt but the Sun is as favorable in condition for animal and vegetable life as the Earth, and has both in proportional greater variety and species. Nature having no limit to designs, uses no duplicates, never repeats herself in anything. No two grains of seed, no two snow flakes, are ever just alike. A million bushels of peas will have no two alike, yet every one has its individuality as a pea. Man cannot discriminate one blackbird from another in a flock, but to the birds they are as individual as mankind to each other. For these reasons it is easy to see that every planet may be peopled with different varieties of animal and vegetable life as it is to find the variations in different countries of the Earth. While the climate of the Sun may be hotter than that of the Earth, Nature can adapt itself to any condition of heat or cold.

Thus far the argument has been chiefly in considering the influence of heat by friction on planetary surfaces. Later this influence will be briefly taken up to demonstrate its interior effect in producing earthquakes and volcanoes.

For a diversion, we will for a while consider the effect of centrifugal force on

the Earth. The Earth gives many manifestations of said force in the shape of the continents, courses of rivers, outlets of bays and ranges of mountains. North America gradually swings to the east as it approaches the Equator; South America, at the Equator, bulges most to the east. The mountain ranges, the Rocky, Sierra Nevada and Cordilleras, in North America, the Andes, in South America, forming a barrier against the further encroachment of the Pacific Ocean. The West Coast of Africa is protected from the Atlantic largely by the mountains of Morocco, including the Black and White, running south, somewhat protecting Senegambia, and then the Kong, with other mountain ranges in upper and lower Guinea, stop the encroachment on line of Gulf of Guinea. In Asia, Hindustan has the Ghant Mountains for a barrier, while another range of mountains holds the Peninsula of Malacca in place. It will be plainly seen that all these points of countries lean toward the Equatorial center of motion. The islands of Oceanica, strung out on the line of the Equator, also show the effect of the Earth's revolution.

The Island of Australia is apparently a new production in embryo of a new continent in future connection with some of the large adjacent islands, and ultimately of most of the island groups of Oceanica. The same result is likely to follow with the Greater and Lesser Antilles.

The rivers are marked evidence of centrifugal force on both continents. The largest, the Amazon, running nearly on line of the Equator and emptying there. All the rivers, almost without exception, north of the equator to the Arctic circle run southeast when they can, and at their mouths tend that way. Those south tend northeast where the face of the country will admit. The Nile, a freak river, is about the only marked exception. On the north outflows like the Yukon, McKenzie, and Great Fish in North America; the Yenisei and Lena, and many smaller streams of Europe and Asia flow to the Arctic Ocean.

These last named streams so far from the great center of motion and on account of the marked incline to the country toward the polar centers head that way and no doubt contribute largely to the great inflow of water to the internal ocean. The west coasts of both continents are marked for their dearth of great streams. The open sea that some Arctic explorers have presumed to be about the poles is no doubt the beginning of the fresh water ocean.

The open sea problem introduces the importance of this disquisition. If there

is an open sea, which is in all probability true, it must be the open door to an inside world as truly as the coming back from those high latitudes and entering open sea is the evidence of our habitable outside world.

With all deference to the reports of Arctic explorers, it is very doubtful if they really know their actual positions or latitudes with freaky compasses and unfavorable conditions about them, so that their stories and adventures while honestly told need to be taken with a grain of salt. They tell us of witnessing the breaking off of icebergs of mammoth size from glaciers, which, no doubt, is true. It would be true if one was seen big as the Capitol at Washington, or as large as the largest Egyptian pyramid, but doubtful if they ever saw one one-tenth as large as the latter or as large as the former.

III.
ICEBERGS.

The venture will be taken here to consider and explain the character and formation of a big true iceberg which it is supposable change their location to both inside and outside waters.

As already said, the ice belt is the dividing line between salt and fresh waters.

This being the case, large expanses of the ocean in the Arctic region must be frozen over. As water is an exception to most everything else by growing lighter as it grows colder, it rises above its water level. Without this provision of Nature, our lakes would become solid masses of ice, and rivers would become mountains, thus extinguishing fish and producing a mass so deep and solid that a summer season would hardly melt away. This can be evidenced in any tub of water standing out in a cold night. Water does not congeal entirely on the surface, but rises in frozen particles from below like cream on milk. This is shown by its rising and swelling up in the center and pressing the outside of the vessel to bursting.

A pond, lake or river frozen so thickly as to bear up heavy loaded teams of horses, and armies of men with all their equipages will be materially arched as it leaves the banks. An evidence of this comes when rising and cracking with loud reports and at the thawing up and yielding of pressure on the banks when loud explosions like blasts or firing of cannons will occur, caused by the settling and cracking of the ice.

As the ocean depths are great and the Arctic night of long duration, the fresh-water portions to a great depth congeal, and rising form a mass of ice inconceivable to temperate climes, both in height and area. Imagine what an iceberg must have been in starting from seventy-fifth to eightieth parallel of latitude and floated through all kinds of weather till midsummer, arriving off the coasts of Newfoundland, and then 300 to 500 feet high with seven times its height under water and so large as to take hours and even days or weeks to pass the main mass of ice and its fragments that have sloughed off. Has any explorer ever seen such a body of ice break off from a glacier that must have

covered scores of miles square when it started?

As an arrow shot into the air bends its course to follow the heavy end, as truly do the heavy elements in the water manifest themselves at the center of the Earth's motion, and the saltness of the Equatorial waters is much stronger than approaching the polar holes, which last term might be used with good reason instead of poles.

There seems to be with all Arctic explorers the obstacle presenting itself, termed the ice belt. This obstacle is suggestive, and leads the way to base the following conclusions:

That the water at this point has become so freshened, as to admit of such a wide freezing belt, but that the boundary line is made between salt water and fresh.

It is not in place here to describe a glacier until the cause and origin is explained, which will properly come after considering the water influences from inside.

The next purpose will be to show and aim to prove that the Earth is hollow and supplied with an ocean of fresh water and habitable land.

As said before the theory of an open sea gives the inference of a new climate and country, therefore now, what evidence, actual or circumstantial can be adduced?

It is claimed by Arctic navigators beyond all their attempts to reach beyond the ice belt, geese, duck, and other wild fowl continue to fly and seem to be in quest of food which they must obtain in waters beyond the ice belt.

The existence of an open sea beyond the ice belt has for years been conceded. As no explorer has reached much nearer than 750 miles of the supposed poles, it is reasonable to suppose that the open sea, so-called, but really a hole must be nearly fifteen hundred miles in diameter. Various evidences have settled that question in the minds of navigators, the most important of which is that the sea fowls still fly beyond the reach of man's explorations. The fact alone that wild geese, ducks, and other sea fowl go on to some feeding ground is enough to settle all doubts or arguments for or against the theory of an open sea of fresh water around the supposed poles. Conclusive reasons are

that no water fowl or fish can live in an ocean of salt water. Strictly salt waters do not furnish any food; but only in bodies fed by streams of fresh waters, as in bays, inlets and mouths of rivers, and adjacent to the coast line of continents or islands where fresh water from springs and rainfalls contribute to produce growth and substances suitable for food.

It was observed by the navigator, Ross, that moose, reindeer, wolves, musk-ox, white bear, and foxes seek winter quarters toward the north rather than to the south, and return when the season becomes favorable, with their young. Fish are noticed to come south but not to return.

As to water fowl, how far they could follow this opening into the center of the Earth, the writer will leave for others to conjecture.

It has often been a query from whence came the Arctic elephants, the remains of which are found so plentifully on the north shores of Siberia, some of which during the last century have been in such a state of preservation as that their flesh was eatable by bears and wolves.

Why were they protected by a covering of hair if not originating in a colder climate than exists south of the Arctic Circle?

Do they not still exist in the interior, or have they passed out with the great Auk, a former external resident?

Why are the latitudes nearest the poles the favorite fishing grounds for whales? Is not the interior ocean of fresh water their natural breeding ground and from thence passing out through Behring Strait and other channels into the outer waters? Can some scientist give us reliable information as to where whales propagate most, and why it is necessary for whaling expeditions to seek high latitudes for their catch?

The hole, fifteen hundred miles across, would not give any conscious impression of there being such an opening. You could not stand and inspect it like looking down a well. This hole opens into a new world unexplored by man, unless it is possible that Sir John Franklin and the Aeronaut Nansen unintentionally drifted in and were unable to navigate themselves out.

It must also, in marking out this theory, be admitted that as the center of the Earth is approached this opening must be somewhat enlarged, and must

assume a concave shape from the center; such being the case, the diameter must increase from one thousand to two thousand miles or more, which is very likely to be the fact. With the motion or revolution of the Earth, the water would assume this condition on principle of the swinging of a pail of water over the head, and would merely be a placid ocean as boundless to the eye as the waters on the surface.

In these expanses of water, it is quite reasonable to presume that islands and large bodies of land may exist the same as outside, and that many fossil specimens thought to have existed on the outer surface in an early antiquity may have originated in the center of the Earth and may even still exist; their ancient skeletons having been thrown to the Earth's surface by the centrifugal forces of water in the same way that all the different stratas of rock have been cast up and mixed in one grand conglomeration from the Earth's center to its circumference. These facts seem clearly to prove by these migratory birds and animals: First an open sea; second it must be fresh water or mostly so; third, it must produce or contain desirable food elements different from what exist in the ocean on the outside, on which these birds can live when they reach their breeding grounds from which they are reported to return with largely augmented numbers. Now this consistent query can arise: Do they stop at a near point after passing this great boundary line of ice and find suitable and pleasant feeding grounds, or go on 500 or 1,000 miles farther? At that distance, the water is more likely to be modified in temperature and better adapted to their tastes and comfort. It seems quite right to assume that they come to inland seas, and pleasant bays, and sounds supplied with food from their shores and feeding grounds, rather than being supplied with anything existing on external parts of the Earth; otherwise, their supply must all be drawn under the ice belt or pass through this great Arctic filter. Again this thought comes up. How did these birds get sight of or learn of this internal feeding, and probably breeding ground? As migratory birds usually fly at great height, they would have an advantage over man in seeing this open ocean, as it is reasonable to think they may have bred as well as fed there. It is only a natural sequence of their migration in and out of this belt or ice circle, just as we recognize their flight north and south with the season's changes.

If they go there by instinct, they merely do what is credited to the realm of life, considered lower in the scale of thoughts than man; but if by exploration

and reason, then man must take a lower scale in calculation than the goose. To conclude this point. If birds live on vegetation, there must be an abundant supply of fresh water to produce it. If they live on fish, there must be the same sufficiency of fresh water in which to breed, feed, and live. If the birds breed, they must have hospitable shores on which to dwell and rest, and favoring skies to contribute to their various wants in order to exist.

Their instincts or reason will never take them where the conditions will not admit of food and drink, rest, shelter, and protection.

One other conclusive evidence that our icebergs are not formed by the breaking off from the terminals of glaciers is the fact of frequently finding them in midocean carrying such passengers as wolves, foxes, white bear, and other specimens of Arctic animals. The solidity of the iceberg is much against the glacial origin, the glacier being made up of a conglomerate mass formed by snow, rain and spring waters, so much so as to be impossible to keep intact to any great bulk. The formation of the iceberg in its method must be a solid mass.

IV.
GULF STREAM.

The first witness from the interior will be the Gulf Stream, the most phenomenal stream of water known to the Earth. This great outlet, authorities tell us, is the result of waters rushing around from the Caribbean Sea through the Gulf of Mexico and out through the Strait of Florida, thus giving force enough to be manifest for more than three thousand miles to the coast of Ireland to give her the climate that christened her the Emerald Isle; from Ireland and the British Isles, its influence is felt to the coast of Norway.

The water is much warmer than at other points after leaving the Bahamas with different marine conditions, such as containing no jelly fish, or showing sparkling waters by night and being always avoided by the whales and other tenants that are in adjoining waters. It is also claimed by those who have sailed many times through it that the color of the water is so different as to be quickly noticeable as vessels enter the Stream. How such a stream can originate with such force in a reservoir like the Atlantic, connected around through the Caribbean Sea and returning to itself, is as obscure to the writer's mind as to how a man can succeed in lifting himself in a bushel basket. A man that can adopt this conclusion ought to apply his energies to developing a machine for perpetual motion.

The Gulf Stream is, no doubt, an enormous spring tainted with sulphur, like many of the springs in Florida and up the coast as far as Charleston, whose waters are warmed from the same influence as the Gulf Stream, from passing up through a deep strata heated by volcanic influences so common in Central America. Its sulphurous taint will account for the absence of whales and jelly fish in its waters, in which waters of similar nature fish are never found. This sulphurous condition may account for the stormy features that prevail along its course. It may be claimed that the waters would smell of sulphur so as to be detected, but such is not necessarily the case; from springs in Florida that flow strong sulphurous water, many visitors will not drink at the spring, but after aërating an hour, it will be drank at hotel tables and from water urns without a suspicion of its being sulphurous. The contact with salt water at the

great depth from which the Stream originates diminishes any odor before reaching the surface and quite likely imparts the noticeable change in color. The deep-sea soundings off the coast of Bahama is another reason that the Stream originates there. It is claimed to be almost impossible at the commencement of the stream to get reliable soundings, as evidently sounding leads would be sensibly affected by the powerful current of water flowing outward.

The next evidence offered is, where does the enormous amount of water come from to supply our lake systems? Nearly all of the large lakes of the world are located in the highest parts. Lake Geneva 1,226 feet above the sea level, receives the muddy waters of the Rhone, but has so much other inflow as a spring as to discharge its waters blue and clear. Lake Constance is 1,290 feet above the sea and 912 feet deep; the Rhine rising at an elevation of 7,600 feet enters this lake. In 1770, the waters rose in one hour twenty feet above ordinary limit. It is said to contain twenty-five species of fish, including salmon. Onega and Ladoga are high from sea levels, and by canal, connect with some of the headwaters of the Volga. Titicaca, 12,800 feet above the sea, 720 feet deep near the shore, and probably very deep in the middle, contains many islands and abounds in remains of Peruvian architecture. Superior, 627 feet above the sea and mean depth about 1,000 feet, never freezing over except about the shores, and presents a temperature of about 45 degrees.

These are only a few in different countries to which the position is universal, for both great bodies of fresh water as well as small ones, as the general impression with people is that lakes are usually in low lands, while the opposite is the true state.

How few people in this country ever thought of our great internal seas of fresh water, Superior, Huron, Michigan, and Ontario, being on the highest lands between the ocean and the Rocky Mountains, yet such is the case. From these great fountains flow the waters that plunge down Niagara Falls, while a larger portion, it is thought, has a subterranean outlet through Lake Ontario, and uniting with the Niagara current to form the St. Lawrence.

Whence come these waters into those great lakes? They have no important rivers flowing in, and their waters are frequently highest in August and September when the country is commonly suffering by drouth. If the supply

were rain water, this whole surface would freeze, but spring water is exempt until well exposed to the air for some time. The lands about Lake Superior rise quite abruptly, and as you ascend the hills, and riding from Ashland to Duluth, will see hundreds of small lakes, and from Two Harbors north as you ascend for fifty miles you see the same state of things till you come to the divide within less than 100 miles, when the waters go west into the Mississippi valley and north to Hudson Bay, and east and south to the Atlantic. Are these lakes supplied with rain and snows? If so, where does the water collect, and how does it get into this elevation? A subterranean river is supposed to run between Superior and Ontario, on account of similar fish being caught in each lake at particular seasons, but absent in Ontario at other times.

The lakes named are only mentioned for their importance; we will now call attention to lakes universally. Whoever reads this subject will be obliged to come to only one conclusion as to the general locality of lakes. Take our Adirondack region, with its thousands of pure, clear lakes hidden away among the rugged hills. The White mountain country where lakes abound. Chautauqua on its elevated ground, Mt. Desert in the ocean with its Eagle lake and others 1,200 feet above the sea. Lakes and living ponds, full of lilies, on Block Island. All through the mountains and wilds of Maine, and so on in every state the same condition exists, till you get to the level and prairie states where upheavals are rare for producing lakes and springs.

If a reader will peruse in “Picturesque America” the descriptive scenes on the French Broad River and the wonders through Delaware Water Gap, it is very doubtful if the various displays of waterfalls and profusion of springs and lakes will impress him with the idea that they are to be attributed to special rainfall in that locality. One particular evidence ought to be enough to dispel any such conclusion.

To quote from page 100: “As one of the wonders of the Gap must be counted the marvelous lake upon Tammany; a lake so singular that popular superstition has been tempted to add a final touch to its surpassing strangeness, and declare it has no bottom. As if in quaint climax to her wild work, Nature, after riving the mountain to its very base, here places beside the chasm on the very apex of the lofty peak a peaceful lake.”

This feature of lakes could be extended indefinitely, but something must be

said about the smaller influences that produce them. Every lake is but a mammoth spring, or reservoir of numerous springs that feed into its base. The provision by nature of this inexhaustible reservoir of fresh water is beyond doubt the most essential of any other bounty bestowed upon every living thing on Earth's surface. The principle of centrifugal motion and power is here developed to its highest advantage.

Every man that has ever turned a grindstone at early morning to prepare a dull scythe for its day's work, has no doubt observed the result of frequent pouring on of water. If he turned slow, it would drizzle off at the bottom, supposed to obey the Law of Gravitation; but if he turned just fast enough, he could keep about a pint of water on the surface of a stone four inches thick and two feet in diameter. Increasing the speed results in throwing the water off in all directions.

If yarn or cloth wet from a tank or vat is put in a tub latticed outside and subjected to rapid revolutions, it can be thoroughly dried in a brief time. The process of separating cream from milk is done on the same principle by which butter can be made in ten minutes' time from milking.

The familiar trick of whirling a pail of water over one's head, is complete proof in itself that water seeks the surface and center of motion, and that all these results are from centrifugal force. A funnel of large, or any capacity, filled and a plug at the bottom removed to admit its discharge, will evidence that motion at once forms a circle, and that the center is bare while the outside is full.

At this point it may be well to call attention to another feature in the river system. The water on the grindstone will give force to this suggestion. At a certain speed the water will tend to the outside of the stone; below speed required to do that, the tendency will be toward the center of the stone, or strictly toward the center of the Earth's motion.

Now let us see what the river system says. Look on your maps and see about where the common divide occurs, which is seemingly not far from the 50th parallel, where centrifugal force is apparently not strong enough to carry the waters toward the Equator, and the principal waters flow toward Symmes's Hole.

Look on your maps.

On the 40th parallel sailors have what they call a roaring sea, which is approximately near the divide of waters, going either toward the poles or toward the Equator.

V.
DAILY MOTION.

Nature seems to have just the right adjustment in all its affairs, whether in coloring of flowers, season for growth, flavoring of fruits, supplies for animal and vegetable life, and instincts for everything created, to adapt them to living purposes.

So in the Earth's diurnal revolution of 24 hours, supposing it was slowed to 25 hours, we should have less wind and tides, less warmth and more land free from the encroachment of the sea.

Increase the speed to 23 hours would give us more warmth by greater friction, increase the flow of our springs, give higher tides, and make most of the present commercial seaports of the world take seats farther back, as millions of acres of land now available would be flooded every tide.

The moon, we are told, has little or no atmosphere. It is pronounced cold and uninhabitable. This all looks reasonable. Being only a little over 2,000 miles in diameter and a revolution about like the Earth through a thin atmosphere, it is easy to see the lack of friction to produce warmth, and therewith the proper constituents to sustain life. This is an easy one and readily disposed of.

VI.
EARTHQUAKES.

It is doubtful if the Earth's crust exceeds, or equals 1,000 miles in thickness. The outside is held from flying to pieces by the atmosphere, which is a sort of tire to the earth, while the inside is constantly pressing from effect of centrifugal force. These two factors must meet somewhere.

On the outside, near the ice belt, the water pressure gets the best of the inner forces and drives the waters into Symmes's Hole. In the Earth the centrifugal force has advantage until reaching the surface; but if a big hole could be cut at the Equator through to the center, no doubt a man could jump into it in safety and cease to fall as he cushioned against centrifugal influence in his descent. Earthquakes are only the effects of internal pressure of water to get to the surface, at times bursting large reservoirs, producing tremblings, and at others with great force throwing up hills and mountains from the tops of which the fountains of water burst forth. At other times they are produced by the contact of water with heated elements in volcanoes, creating the commotion leading to the volcanic eruption, the latter of which can only be produced by contact of fire and water.

It is believed that this is the complete and brief explanation of earthquake causes.

VII.
VOLCANOES.

The volcano is nothing more than a local fire, as much in connection with the Earth's surface as the furnace fire built in a man's basement to warm his house, or in his stove to cook his breakfast. When the fuel that is used in either one is consumed, the fire goes out, which is a common result in both cases. Of all the volcanoes known to have existed as evidenced by their craters, fully three-fourths have become extinct.

Now what causes the volcano? The Earth is filled with immense supplies of fuel, consisting in stores of coal, sulphur, oil, gas, limestone, etc. While it is claimed that at the imaginary axis of the Earth there can be no friction, yet when the surface is approached with all its weight of mountains and continents, here friction begins to put in its work. It is very doubtful if any volcano exists, or ever has existed whose fires go to the depth of 500 miles, and more likely not half that distance.

On the outside of this circle, of 25,000 miles it is only reasonable to expect an enormous strain. The abrasion of limestone found in huge masses will, by process of heat, convert them into lime. The contact with water, universal throughout the Earth, will start the volcano, which by slaking, this small amount of rock converted into lime will generate a heat that may ignite and produce more lime, or reach other combustibles, which may be set on fire by this; or when in contact with other substances, this would lead to reservoirs of oil and gas, and deposits of coal and sulphur. These when ignited may remain in a slight slumbering condition and burn for ages, but water will be the constant aggressor and from time to time will manifest itself by coming in contact with these burning forces thus producing the volcanic eruptions and in time will be the conqueror, and the crater of the volcano will become a lake, of which evidences exist all over the Earth. That volcanoes are only local, the same as fires in our houses, is fully evident from the fact that they burn, and go out. This theory of producing volcanic eruptions can be easily demonstrated in every kitchen or casting shop in the country. Kettles of hot fat or melted metals when brought in contact with water will cause a

miniature eruption at short notice. It is common to speak of volcanoes emitting smoke, but it is rare that such cases are ever a fact, but instead of smoke, we should say steam. The result of friction to produce effects, we claim, is well illustrated in shipments of cotton. Cotton shipped from India in the vessel's hold, rarely, if ever, takes fire. From this country it is no unusual thing, and why? In India they bind the bales with jute or hemp, while in this country with straps of iron. In the ship's hold, there is, of course, a constant motion and rubbing together of great weight of bales which ofttimes generates the fire in the cargo. This is the way the volcano is started, but sooner or later, water will put it out. All volcanic eruptions are credited with throwing out great volumes of water, steam, mud, ashes, stones, lava and sulphur. During earthquake convulsions which generally precede volcanic eruptions, the world over there is a bursting out of fresh springs as well as an increase in the present existing flows.

WHAT ARE VOLCANOES FOR?

If they are, as is claimed by some, for vents to the interior molten condition, why do they become extinct, so many of them, and almost invariably become lakes inside their craters?

With the whole center of the Earth a molten mass, there ought to be fire enough to keep them going incessantly. Where does the water come from to keep up a constant outpour of steam and vapor in locations where it seldom rains?

It would seem as if the small amount of rain or snow that fell would get pretty well dried out before it arrived at a point to create an eruption by contact with melted rock, or that such a quantity could keep up steam in such an immense cauldron. There is no reason to presume that a drop of rain water ever enters a volcanic crater, except what may fall into its open mouth, which will be impossible.

Have Volcanoes any specific use in Earth economics? Do they tend to open up water courses from the interior and by their upheavals on the continents and islands of the Earth create natural elevated reservoirs from which the lower regions of Earth can be irrigated? Do they not send out certain gases to mingle in the atmosphere, producing favorable results in vegetation and animal life? Are not the vicinities of volcanoes noted for the fine fruits and

wines in latitudes in which they grow?

VIII.
RAINFALLS.

This chapter being devoted to rainfalls, a few introductory observations may be in order. The essential need on Earth's surface for growth of vegetation, and the sustenance of life, depending thereon in some form, is in universal irrigation, which Nature failed to furnish by its internal provision of water with its outflow of springs and lakes, except by artificial use. The rainfall on the Earth is no more intended for filling of springs, lakes and seas than it is for supplying us with fuel. It is simply a provision for surface watering of vegetation, and has no more effect on the existence of living springs and subterranean outflow of water than the eclipse of the moon. There never was a rainfall, except, perhaps, in Noah's time, that wet the general surface of the country to the depth of three feet, and rarely one-half of that. It is generally called a good, soaking rain that moistens the bottom of the potato hills, and to wet what the soil will hold one to two feet requires a prodigious amount of water. It is claimed by proprietors of orange groves that a volume of water of six inches in depth is requisite to thoroughly irrigate the grove. If the claim that rain has no effect on the supplies of springs and lakes be true, you will ask why it is that after a long drouth and a heavy rainfall, the springs resume running, and water returns into wells that have for a time been dry? The effect on those sources of supply is simply the same as results from wetting a sponge to take up water which will not absorb and be taken up in a dry one. You can easily be convinced of this effect. To show that water will run uphill or away from the Earth: The surface of the Earth becoming saturated, and in some places penetrating into the seams and crevices of rock and soil, at once forms a medium of attraction for the waters below to follow. Another valid reason is the general condition of the atmosphere from the time of drouth to a condition of moisture when it becomes really a mammoth sponge after being dampened. Against the claim that rainfall has little or no influence in raising or producing springs or lakes, or living wells, this question naturally arises regarding springs, which has in a measure been answered. It is, however, a pertinent question, and a pleasant one to answer fully.

In the summer season, most commonly of any, the air becomes hot and dry.

The surface of the Earth loses the moisture of the air's influence, together with the Sun's heat evaporating the dampness, becomes generally arid, and fails thereby to be a conductor of the moisture from below.

As a season of very dry atmosphere occurs for months at times, the soil becomes correspondingly dry and dusty to quite a depth. From this cause the springs and water in wells recede and sink away. It is an easy matter to find people who have witnessed the following seeming phenomena in times of drouth: After a period of weeks or months of drouth before any rainfall has occurred at all, the fountains, long dry, often commence to run, and wells begin to fill with water, and this without a drop of rain.

Just here comes the pleasant task of answering the question fully: How can this occur without a soaking rain?

At such times, when the Earth and all nature is thirsting for water, and every fountain seems to have dried up forever, the day will come which will bring these evidences.

The aged will complain of their rheumatism; men's bones will ache; geese will wash in the dust; the peacock will scream; birds, beasts and vegetation will feel a humidity in the air and intuitions that rain is near. As the atmosphere has felt the approach and preparation for rain some time in advance, so all Nature feels its effects. To illustrate the burned or dry condition of the air, you may consider this test: Take a pail of water, and a dry sponge, big as your head, and lay the sponge on the surface, and it will take a long time for the sponge to absorb the water and become fully saturated. Wet the sponge before the test and squeeze it dry as you can, and lay it on, and it will fill rapidly and quickly. Pour a pail of water on the floor and try the same experiment. Your sponge will not fill at all if dry, only a little as it comes in contact with the water; but moisten it as before, and press it nearly dry, and throw on the puddle of water, and it will drink itself full at once, drawing up the water like a pump. You cannot wipe up a floor with a dry sponge.

The springs and wells that have dried and receded a short distance from their usual level from lack of moisture in the air that penetrates the surface, quickly feel a returning moist condition and are drawn by the same influence upward as the water climbs up through the damp sponge.

The atmosphere performs the same duty as the sponge, and this answers why the springs and wells resume running before a drop of rain has fallen, and which, when it comes in copious quantities, still adds to the general effect of making a stronger draft on the fountains below.

Another question proper to ask scientists is this: If the rainfall affects springs and lakes, how is it that the analysis of mineral springs in all quarters of the globe is not affected by every change of season? How can the waters of Saratoga, Carlsbad, Waukeska, Kissengen or of any other such spring be relied on for uniform assays? How can this great variety of springs come in such near proximity to each other and possess such distinctive curative properties as at Saratoga, for example? Within a radius of two or three miles are springs, one of which is a cathartic, another a diuretic, another emetic, another tonic, and so on, no two alike, but retain their individuality through all times, wet or dry? They are affected only in amount of flow by the same atmospheric conditions of either dryness or moisture, as just described.

When the atmosphere is heavily charged with moisture, it becomes a mammoth sponge, and this condition of air, evidently, is what precipitates thunder showers in the summer. As all the hills and mountains are the result of water upheavals, they are for this reason the reservoirs of water for watering the Earth, and therefore quicker to respond to atmospheric conditions than the plains.

It is almost without exception that thunder showers form their nucleus on the heads of mountains and the tops of hills.

After a shower let us see the condition and results. The face of Nature smiles after its refreshing wash; every tree and plant has drunk its foliage full of new life; the air's sultriness has changed to freshness. All animated life seems to take a fresh lease, and as the clouds roll away and the quickly swollen streams rush to the rivers, lakes and oceans, it seems as if almost a deluge had passed by.

The remarks, "What a lovely shower!" "What a much needed rain!" "What lots of good it will do!" etc., pass between neighbors. Farmer Smith comes along and says, in reply to the shower being such a cracker, that he went into his garden to set out cabbage plants, and down little over an inch the ground was dry as powder; that while this will do lots of good to grass, and "sich," it

wants a good soaker to get down to the bottom of the potato hills.

Such is the history of most of our copious showers that flood everything for half an hour, but not a drop reaches the roots of forest trees of any depth, or does anything more than to temporarily wet and freshen the surface.

Such being the case on the prairies and unbroken plains, the evaporation of two or three days' sun leaves them in almost the condition of a desert. This was the case in our new States, Nebraska, Kansas, Colorado and Indian Territory, which, now so productive, were, as our early Geography describes them, before the soil was broken to hold the rain for a while, the Great American Desert.

On a hot day the air in the valleys is still and suffocating. Climbing up from the valley to the hill or mountain tops, you find a cool and refreshing breeze; the moisture in the air is becoming condensed. Here is where the philosophy of lightning seems to work a prominent part. The cold currents of air and moisture, collecting, seem to come in contact with this subtle and wonderful agent, and the result is like fire to powder, a vivid flash and explosion. Stand on the plain on a sultry day and watch that little white crest of what we call a thunderhead. The farmer who has hay down will notice it with a little anxiety. The sailor will think of his sails, and the picnickers will think about going home. Soon a flash, and a dark base is forming. Soon the rumble of thunder is heard; the girls with their bonnets on begin to look worried. The captain on his yacht is giving orders to reef sails, and Farmer Jones and his boys are cocking and pitching hay for their lives.

The little white-capped clouds of an hour ago have turned into a black and threatening massed park of artillery. Every discharge deepens and darkens the advancing column.

Just as the vessel's sails are dropped and snugly reefed, just as the farmer rushes his team, with load of hay or grain, into his barn, and the picnic is almost under cover, the big drops of rain begin to patter. Another flash and quick report; a scream from the girls, nearly as sharp, and they rush for shelter, and down comes a torrent of rain.

A slight cessation, another flash, and, like shaking a tree of fruit, every electrical explosion seems to shake down a fresh reserve of rain drops. This is in keeping with the theory that after great battles the cannonading produces a

copious rainfall.

It is a method at times adopted by military garrisons when destitute of water, when the atmosphere is in a favorable condition for rain, to get out a battery of artillery and have a season of vigorous firing, and generally with successful results.

And while all this grand and complete arrangement supplies vegetation with its bathing and drinking, as said before, it has nothing to do with the living and lasting supply of our springs, lakes and rivers. They are fed from a never failing and almost unchanging source—that is, by the immense supply taken in at the polar holes in a river over 4,000 miles wide at each end of the Earth's axis.

That the presumption of rainfall furnishing the supply for all of our lakes, springs and wells has never been questioned seems almost discreditable to the observing talent of our age. Whatever the character of rainfall, either by protracted storm or sudden and copious showers, it cannot escape our notice that the largest portion of the water runs from the highlands to the lowlands into the gulches and small streams, and thence to the rivers, into the ocean; so that the percentage of water retained by the soil is much smaller than that which runs away.

In our Western prairies, the country formerly called the Indian Territory, the soil was covered with an almost waterproof matting of grass roots, on which, when showers fell, the penetration was so slight that in a very few days evaporation left them parched and dried. Since the settling up of our territories, which were once termed deserts, the soil has been broken by the farmer's plow, thus admitting the rainfall to be longer retained in the surface soil, which fact has led to the development of lands once considered barren to become some of the most fruitful grounds in our domain.

Another peculiar feature of climatic change may be mentioned here, whereas until recent years thunder showers and storms were almost unknown in many of our Western States and in the Pacific States also, till now these storms and showers, with their electrical disturbances, are nearly as common as in older States.

Another feature of weather which has seemed to develop in recent years is that of milder winters in our Northern States and colder freaks in the

Southern; snows and frosts reaching States which rarely ever had such experiences, and the burdens of snows becoming much less in States which always expected a long season of sleighing.

It is proposed to venture the following reasons as conducive to much of this change in weather conditions of the country at large. First, the general denuding of our forests, which evidently has much influence on the water courses. Next, the settling up of the whole country, and location of cities and towns from ocean to ocean, all quite evenly distributed, and in a great portion of them large amounts of machinery, composed of iron and steel, producing a great amount of friction and electrical influence in their workings; besides the almost innumerable fires from furnaces, factories and households, discharging their heat into the upper air. Again, the railroad system, with its millions of tons of steel rails, make a magnetic connection between every State and almost every county in forming one grand combination. The rush of thousands of trains all over the country, with their friction by wheels on the tracks, and the rush through the atmosphere, cannot fail to influence in largely equalizing the same. Still another potent influence must exist in the almost unlimited number of wires for telephone and telegraph purposes, which make all the electrical combinations more complete than anything else. If all these things combine, it does not seem strange that magnetic and electric currents and conditions of our weather throughout the country should be somewhat modified.

IX.
SPRINGS.

The person in full enjoyment of health rarely ever appreciates it to the fullness that he will on being deprived of it and have its welcome return.

The bounties of Nature are so great and common that they fail to attract our attention to the extent of some trifles that come new into our way from day to day. One of the greatest provisions of Nature, as universal as air and Earth, is the millions of springs gushing up through the pores of the Earth in every country and clime. To make this provision of fresh water ample, needs very large reservoirs for supplies. The amplitude of this reservoir, if the situation is as claimed in this book, it is believed everybody will admit. To prove that this supply comes from such a general source a class of witnesses must be brought out. One of the most important must be the feeding of our great lakes on high altitudes. These great bodies of fresh water are universally credited with enormous depths of pure, clear water, such as never could exist as the result of shed water. Many of them practically have no streams feeding them, but, without regard to weather conditions of seasons, pour forth enormous bodies of water without change of volume. Lake Superior will be taken again as a prominent witness. Here is an inland sea, on the highest ground between the ocean and Rocky Mountains, so large that vessels can sail on it for days out of sight of land. Not a river of any importance flows into it, the country around it not admitting the formation of a large stream.

The water during the hottest summer months sustains a uniform temperature of forty-five degrees, and is as clear as crystal.

The outflow from this lake furnishes the great river passing through the Sault Ste. Marie, through which passes a greater tonnage of vessels than through the Suez canal, and most of them of very large draft. This river with the combined waters of Lake Michigan and Lake Huron passes on through the Detroit River and Lake Erie and over Niagara Falls. It is also claimed that from Lake Superior a large subterranean stream flows into Lake Ontario from which lake the stream in junction with Niagara river forms the St. Lawrence,

the river so copious in its flow as to be immune from floods.

This question is in point: Where does this enormous supply of water come from to supply Lake Superior?

Without taking single witnesses, we will call up groups. Take the various great lakes of the world, Europe, Asia and Africa, where all great rivers seem to have their sources in some lake.

As to rainfall if that originates these streams, and if so, how is their flow kept so uniform, or is it from a steady, unfailing source, as would come from the inside ocean of supply?

Lakes of enormous depth exist in the Sierra Nevada, and Rocky Mountains, as Pyramid Lake, Donner, Tahoe and Crater Lakes. In our Adirondacks are thousands of lakes, in Vermont and New Hampshire, and in the White Mountain region, throughout the mountain portions of Maine, in West Virginia, and the Carolinas, and in other high and mountainous sections lakes abound. As we come to the low country there are few witnesses to call, as the only body of water worth mentioning is in Utah, that lake being salt and below the level of the ocean.

While the subject of this chapter is introduced under the heading of springs, it may seem out of place to bring in these great lakes, assuming that they are of the same class. But there is no doubt whatever of their being nothing more or less than mammoth springs.

Next to the great lake system of the world, may be called in evidence the atolls so prevalent in the southern Pacific Ocean and growing also in other places on the globe. These peculiar features appear to have been built up from the tops of submarine mountains or old craters that have been filled with fresh water, from which structures of coral have grown till they reached the surface. The formation of these atolls being generally elongated, or in chains like mountain ranges, is suggestive of the same influence in their inception as the upheaval of mountain chains on land surfaces by hydraulic pressure.

This may be a good place to ask where the fresh water supply comes from to produce these atolls. That they are produced by fresh water there can be no question, as the work of coral is never performed without an abundance of this element to build through. That the bottom of the ocean has many

subterranean rivers nobody will dispute. That nearly every island in the ocean has springs of fresh water, none can deny. Where does it come from? Many of these islands have thermal springs, like Iceland with its geysers of many varieties. Some with common fresh water, and nearby springs of mineral water. One familiar to this region is Block Island with both fresh water and mineral springs, and little lakes on the high ground alive with fresh water fish. Are they supplied with rain water?

Mount Desert is a very good witness to call. Here is an island eighteen miles in diameter surrounded by salt water with an elevation of 1,800 feet, and 1,200 feet above the ocean are three fine lakes, Eagle Lake, Crooked Lake, and Echo Lake. In which lakes are trout weighing eight or ten pounds. On this small island are to be found thousands of springs pouring out from every crack and crevice. The water is pure and clear as in all such cases. Where does it come from? No more generous gift to man and all animated nature, has been bestowed by Providence than the universal distribution of springs all over the world.

Within twenty rods of the top of Mount Washington, the highest peak in the New England States, flows out a copious spring of water. The whole mountain system is full of springs and lakes. The entire Adirondack region is in the same condition. It is safe to leave it to the reader who has ever been out of sight of the smoke of his own chimney to think of the abundance of instances where he has seen lakes and springs on the tops of high hills, where no shed water to any extent could reach them, and wonder how they came there.

To assume that rains sink into the ground and form water supplies, seems incredible when the experience of any man who has ever dug a well or sunk a shaft in a mountain, or tunneled under a hill ought to disprove such an idea at once. As we dig down we always meet water, and the deeper we get the more we find. Where does the water from the surface turn around to come back? Some of the water coming up is salt, some fresh, some hot, but mostly of a uniform coolness of about fifty degrees.

X.
GLACIERS.

We hear a great deal said about the age of Glaciers. This is assuming that the Earth has at some time been in a condition to be almost uninhabitable, as evidences of this Glacial influence seem to be reported from all parts of the globe.

As the theory of a warmer climate having existed in primeval times and that the Earth is and has been for ages cooling off hardly leaves a place for a universal period of Glaciers.

It hardly seems rational that the vast accumulation of flora to produce the coal deposits and sustain the wonderful specimens of animal and reptile growth could have been interrupted by a period of ice. If so, the earth in its present condition shows evidence of growing warmer instead of cooling off.

It is by the writer seriously doubted that the many evidences attributed to glaciers can be charged to their influence.

Where large rocks are found foreign to anything in their immediate surroundings and similar to formations at quite long distances away, the explanation that the straggling specimens were carried there by glaciers is not necessarily conclusive.

There may be many instances where such evidences are the work of glaciers, but it does not seem as if an ice age were needful to produce the changes of rock, or to show the markings on rocks claimed to have been caused by glacial abrasions. Icebergs can produce and explain every such feature as is claimed for the glacier, and there seems to be little reason to doubt that similar evidences such as are imputed to glaciers are constantly going on as much at the present day as in any remote age in the past.

There can be no doubt that icebergs have existed in all time from the earliest movement of the Earth’s machinery.

As explained in treating of icebergs, an area of extent equal to some of our

smaller States frozen to a depth of thousands of feet breaks up and floats away from the polar oceans. Presuming an iceberg large as the State of Rhode Island to start off, which is very likely a small estimate of the size of many, such berg being exposed to thawing winds and the sun's rays until thousands of miles away from its starting point, and after all these exposures is often a mass of 300 or more feet high and 2,000 feet deep. Imagine the weight and force of such a body striking the peak of some submarine mountain, the top of a hill with the momentum produced by wind and tide. There tops could as easily be wiped off and carried long distances, as a man can strike off the top of a measure of grain, and leave the same marks attributed to glaciers.

These great masses of rock and soil supposed to be transferred from their original deposit are carried long distances till melting has loosened a hold, and they are dropped to the bottom of the ocean and left for the wonderment and surmise of the future as to how they got there. This process of wiping off high points of submarine lands must be going on just as much at the present time as ever in the past, and seems a very wise and cheap system of dredging instituted by Providence.

With the reasoning to follow of how the Earth obtains and maintains its warmth an ice age would seem an impossibility and absurdity.

WHAT PRODUCES A GLACIER?

Here again the influence of Springs is called into service. As all the hills and mountains, it is here claimed, are the results of water aided by centrifugal force, therefore the hills and mountains become the reservoirs of supply for all the lower parts of the Earth. This arrangement of Nature provided the means for producing a Glacier. At high altitudes in the mountains, whether in the frigid zone or in the temperate, break forth springs; coursing down the mountain side to the valleys, the waters soon become aërated so as to freeze. Springs from different ranges and neighboring heights contribute their streams, all commingling in the deep cañons and freezing in a mass. With the accumulations of snow and rain, this body grows until in time, by the constant supply from the springs, rain and snow, the mountain gorges are filled however wide and large they may be.

This monstrous aggregation of ice must of course seek a lower point by its

enormous weight and constant accumulation on top, and naturally begins to crawl down the valley grade. The first inception of a glacier is spring water, which with other contributions named ultimately produces what may be called a river of ice.

Under the ice river is always flowing a stream of water, and many air holes and openings are found upon the surface at different points, no doubt produced by the influence of spring water coming in of temperature above freezing or at the usual fifty-two degrees, about the average of fresh water springs in all latitudes. This conglomeration of influences to make a glacier shows the absurdity of having such solid masses break off, as claimed to be seen by Arctic explorers, large enough to remain intact well down into the Atlantic Ocean. As these mountain ravines fill up, of course the waters involve and cover with ice, every rock and tree, and all such objects in the way must necessarily be carried to some lower point and ultimately left. This faculty of a glacier has given it credit for performing all such apparent transitions, while icebergs which evidently do 1,000 times this amount of work are getting much the smaller share of credit.

It has been reported by sailors in the region of icebergs that by observations taken during a few months, they perceptibly grow many feet higher, which goes to prove the claim that they are constantly being added to from underneath. With change of season, these monsters are floated away from their moorings, toward the Equator to cool and freshen the main oceans, produce electric currents of air, become the wonder and terror of ocean travel, and melting away under tropical suns; or on the other hand, some may seek the interior and contribute themselves to the cooling of the waters that manifest themselves in refreshing springs all over the Earth.

There were newspaper reports of large masses of ice being thrown out during the great eruption in the Island of Java, but such statements may do better for newspaper items than to sustain an argument in this work. How can this equable condition of spring water, with its delicious coolness adjusted to all seasons and tastes, be accounted for if it does not come practically from one common source? Will some scientist answer?

XI.
CAVES.

These peculiar freaks in the Earth are nothing to excite much curiosity or wonder. It is rare to find caves only in limestone formations which by long contact with water gradually wash away and leave monstrous chambers that have formerly been a solid mass.

Sometimes a cave may be formed by a sinking of the floor, leaving the arched top supporting itself, but whatever the cause and wherever caves are found, I never read of any but lead to subterranean rivers of great purity and coolness of water, nearly all the waters of which are credited with blind fish. Where did the fish originate? The stalagmites and stalactites tell of the copious influence of water.

What is the source of these cave rivers? Are they from soakage of rainfalls and do they have any dry season?

XII.
ARTESIAN WELLS.

Here is a subject that is worthy the attention of settlers in our arid and apparently desert regions of country. We are told that the source of an artesian well is from fountains of water gathered and stored in higher lands that run through different strata of rocks till they reach the valleys, and when the boring reaches down to these strata the water naturally comes up toward the height of the fountain it started from. Would it not be a sensible inquiry to make as to where the supply came from to furnish the water in the higher lands? That the accepted theory of supply to artesian wells comes from some higher point is not correct can be demonstrated on the prairies, where no higher land is in sight.

A very good test occurred some years ago at the Hamilton mine, adjoining the great Chapin mine, in Wisconsin. It became almost impossible to work the mine on account of the great influx of water.

Not much more than a half mile away was a lake that was charged with producing this annoying flow.

At the time of a temporary abandonment, the writer disputed this solution, and a survey was proposed to determine the level in the lake and mine, which showed the water in the mine eleven feet the lowest. To overcome this encroachment of water, an ingenious device was adopted by building a chimney over the point of inflow to the height of water level and stopping at the bottom; when completed allowed to fill.

When its true level was reached the rest of the mine was dry some distance above. It is doubtful if any place on the Earth will not respond with a flow of water within a mile in depth and rarely half that distance will need to be bored.

In the Mojave desert it is claimed a depth of 200 feet and often less gets a good flow of water. What sends it up and whence its source? In Michigan, Wisconsin, and many other adjacent States, a depth of 100 or 200 feet will

produce large flowing wells. Where does this universal supply come from and why unchanged by wet or dry seasons? The flow from Lake Superior is frequently larger in the dry season of August than in the wet season of spring.

If there is no unfailing supply of water in the Earth, where does the influence come from to produce an Oasis in a desert?

If artesian wells are bored in our arid and now almost worthless lands, wherever a fountain of water is tapped will be an Oasis around which the settler can produce fabulous wealth of crops and obtain forage for live stock. The expense of boring wells will be largely compensated by cheapness of land and bountiful results in vegetation.

XIII.
OASES.

These green spots in the great deserts are the counterparts of Islands in the oceans.

If not thrown up and fed by water upheaval, how are they produced? Are they volcanic? The Oasis of Ammonium, or Siwah, six miles long and eight wide, contains the ruins of the famous temple and oracle of Ammon, visited by Alexander the Great, and celebrated for the fountain of the Sun, whose waters are warm at morning and evening, and cold at noon.

There are several oases not long distances west of the Nile in the Great Desert. The ancients considered them as Islands in a Sea of Sand, but they are really elevated lakes, although not manifesting themselves much at the surface, but underlying so closely as to render the climate too unhealthy to live in during the summer and autumn, being of a swampy character, and yet very productive in winter and spring. Where do these waters soak in to produce such spots in the deserts?

XIV.
THINGS THAT PUZZLE US.

It is frequently a query how the distribution of fish is so general even in the most obscure lakes and springs rising and running from points so isolated as to apparently preclude such specimens from getting there. It seems strange that some species would exist at the head of a stream and not inhabit it throughout. Seas and lakes may, and do exist, without any visible outlets to the ocean, and yet are plentifully supplied with varieties of fish. Now what may be a rational explanation of how they got there. It cannot seem right to say that they originally existed in an adjacent sea or the nearest approach to the ocean, as they are not found in any adjacent waters and are entirely peculiar to their locality, having no neighbors akin. It does not seem as if such would be the case if they became isolated by some remote upheaval and change of surrounding Earth's surface, as this would only divide up the family and spread the species like immigration from the eastern to the western states.

As asked before, where do these blind fish come from in caves where streams do not seem to have any connection with surface waters? Where do the many specimens come from in the island lakes all over the world? To all these questions there seems a simple answer when we accept the idea that the center of the Earth is the womb that is developing and sending out through every pore, seam, crevice and crack some new seed and form of life to develop a new and strange existence to us on the outside.

It is a Scriptural idea that "We are born of water."

Creatures that have their inception in the bowels of the Earth cast their eggs as the fish and reptile spawn in our rivers. These eggs or spawn or seeds of life in whatever form are taken in the currents that course through the different strata of the earth by centrifugal force and pressure, taking almost any amount of time in their hermetically sealed transit before they reach an atmosphere in which to develop into a new existence. Any lake, spring, or fountain of water that is a living stream fed by the inexhaustible sources

within, may have from that varied storehouse and laboratory of nature any specimen of fish, scale, skin, shell or reptile of any form, that no adjoining or neighboring water may develop.

The spawn or egg may be destroyed on its outward passage or held back by influences preventing its maturity; or landed on the surface under unfavorable conditions of climate, air, and properties in the water.

Why do shad not exist anywhere in similar coast waters? Where do they come from and is the Gulf Stream to be credited with their origin? Where do the different schools of blue fish, mackerel, herring and numerous other fish find their headquarters to breed, and why after seeking other waters for a season, return to some place that seems to be their “sweet home”?

Was Seth Green the pioneer in transportation of spawn to distant waters for their incubation? It is more than likely that he was not; with all credit due to the great service his genius has rendered.

What is said of the dissemination of fish, shells, and reptiles may be consistently said of vegetation.

The earth is filled with the seed of every plant and tree and shrub that ever sprang into life in any place, clime or time. Dig to whatever depth you will, the substance you throw out, whether earth or stone, when exposed to the air, will produce some growth of vegetation. Frequently something entirely new and different from the surrounding vegetation. To assume that streams, winds, and birds carry and distribute all the seeds to their different localities where found in an isolated condition, is too much for human credulity. On the tops of mountains, where streams do not run uphill on the surface, where the birds seldom fly, and on spaces impossible for seeds to be carried by winds, you find species peculiar to their altitude, atmosphere and soil.

Through the channels that eternally pour from never ending supplies, and in which storehouse are mingled the seeds from every valley, plain and mountain top of our Earth; from this source they can be scattered and mixed in every inch of the soil which composes our Earth from center to surface, and when brought into contact with our atmosphere start into new and varied existences.

The question may be reasonably asked if many of the reptilian specimens

attributed to remote antiquity as belonging to our Earth's surface, may not be specimens from an interior world, and even now have representatives of their existence there?

Certain plants and growths require specific treatment and conditions. Wherever pond lilies, peppermint, cattails, flag-root, cresses, and moss in wells are found is unfailing proof of living fountains of water.

The ocean furnishes every facility of transportation through the co-operative system without and within. The millions of seed that mature in different climes on the surface are dropped and carried by floods and currents into the main ocean. Some sink and lie buried for ages, retaining their germs of life, for the outer ocean has its regular currents and motions to such an extent, it would not make a general distribution of seed in countless years.

Through this avenue passing under the ice belt, every variety is more or less drawn into this general receptacle which, in turn carries them inward and outward, and in course of time filters them in their course into every inch of the earth through which the water passes; which is in this way the medium of transportation.

By this means every spoonful of earth is in time prepared to give growth of new life to any plant or tree that has ever existed when exposed to the influence of air and heat or even cold, to revive its species.

In passing to the surface, like the spawn of fish, they may pass through localities of such excessive heat as to destroy their life germs, as is undoubtedly the case with the spawn that should travel through waters like geysers of Iceland or the Yellowstone Park or waters similar to these, whose streams that flow away always show a dearth of fish.

With the Earth formed like this, the writer claims it to be on the principle of a globe for a gas jet, open on both sides and presenting as it turns inward a funnel shaped entrance, which is without doubt over 1,500 miles across; this passage would be just as vast to the eye as the size of, or distance to, the fixed stars, the eye losing all conception of measure, and a thousand miles is just as much beyond our scope of vision as a million.

In almost any position you can imagine the Earth to revolve around the Sun, one of these sides or ends must be partially and at times wholly exposed to

the Sun's rays, and the effect, it seems natural to suppose, would make the interior horizons light as the exterior. The water, it is believed, on any body acts as a reflector and is a giver of light from every planetary body in some degree.

It is all gas, to talk about the gaseous condition and nature of the Sun, and "other worlds than ours." They would at best be a very poor investment and not worth the labor and genius of a power able to create; 160 acres of good land in any productive locality would be worth more than 1,000 such whirling pyrotechnics of space.

It is altogether too presumptive to suppose that our little Earth with all its boasted cities, and boroughs thrown in, can be the only habitation for poor, vain and sinful man.

XV.
METEORS.

These are nothing more or less than dust particles thrown from volcanic eruptions on some planet, and in countless numbers drifting through time and space till sucked into the atmosphere of some other orb.

Whoever doubts the influence of friction ought to be convinced by watching these meteoric specks falling through our atmosphere of a clear evening, although the process goes on as much in day as night time.

While falling in space this dust must gain an inconceivable speed, as a feather without resistance falls as rapidly as a ball of lead.

The contact with our atmosphere ignites and evidently consumes them into gas before reaching the Earth. They used to be called falling stars, but if they were of inferior magnitude it is quite probable there would have been many a badly bumped head before this time, from the numbers that have fallen.

XVI.
ATTRACTION OF GRAVITATION.

This seems to be a question not fully settled by sufficient authority. It seems as if this term were incorrectly applied and that suction would be a better name for the agency.

That bodies fall to the ground when dropped, or return when thrown or shot into the air is nothing more than a stick of wood thrown into a stream floats with the current and drifts to the bank.

Most people when asked which side of a fan you feel the air from, when fanning yourself, naturally reply from the side toward you, but by trying the experiment you will soon discover that the air comes after the passage of the fan, only filling the space or vacuum the fan has made.

It has often been asked why people trying to board a train in motion are so apt to be drawn under the wheels, and legs and arms crushed. It is the same reason as with the fan, a large vacuum is being produced and proportionate suction occurs to fill it.

A man can stand alongside a train when motionless and lean against it, or put his hand on it, as safely as on the depot, but when in motion of thirty or forty miles an hour, it would be almost sure to cost him his life. Attraction can hardly be possible except by affinity; iron can be attracted by a magnet no more than wood, unless possessed of that peculiar quality of being magnetic. Mr. Edison's experiments have to be confined entirely to such bodies of ore.

That attraction of affinity exists there can be no doubt, as exhibited in plants, insects, birds and animals, both quadruped and biped, otherwise courtship and marriage and all means of propagating species would be for naught and neglected.

It is a general supposition that we derive our heat from the Sun by direct rays, but it is doubtful if it comes only through its innumerable rays of light through which the Earth and the planets revolve, and here friction puts in one of its special works. The common idea that noon-day is the time for the

greatest heat is not always justified, for other influences, such as friction in the atmosphere, can make midnight warmer than noon.

The concentrated rays of the Sun at midday of course bring them so closely together, and direct, that the Earth's revolution comes squarely across them, as can be demonstrated across the teeth of a comb, thus showing a greater pressure than drawn obliquely.

That heat can come directly from the Sun seems an impossibility without some medium of contact, which through the coldness and a barrenness of space does not seem to exist.

As we arrive at certain altitudes in the mountains, we find perpetual snow and ice, and the same class of atmosphere is encountered anywhere else rising in a balloon to similar heights. It would be natural to expect an increasing warmth as we get away from the Earth toward the Sun, but the reverse being the case, it is hard to imagine what the temperature of space 1,000 miles away must be.

The question is likely to be asked, if the Sun does not send out heat, how is it obtained?

The answer will be in accordance with the first proposition in this brief work. All heat is obtained by Friction, in absence of which there can be no heat. The Earth gets its heat mostly by friction through its atmosphere.

The mass of atmosphere surrounding our planet is like an ocean made up of gases and elements that produce both water and land. The revolution of the Earth through that atmosphere at the rate of 1,000 miles an hour, seventeen miles a minute, or nearly four miles every second, is something as incomprehensible to our minds as the distance to the Sun. Only for this friction for a certain distance from the surface, the same condition of cold would no doubt exist on the surface as on the tops of the high ranges of mountains.

The Earth is producing its own warmth by friction in its atmosphere the same as a wagon-wheel would do by being rapidly revolved inside of a loose tire. The atmosphere is virtually a tire surrounding us, through which the Earth revolves, and by Friction produces the warmth as really as a man warms his hands by rubbing them together.

That the Sun can be an inconsumable body of fire, or that it can become extinct is a most preposterous belief.

That the Sun is a vast body of earth and water hardly admits of a doubt, and its warmth and light is due to the same influence largely that the Earth and every other planet experiences.

There is not and cannot be a complete consumption of material in the immutable affairs of Nature, as there must be an eternal and exhaustless interchange of supply and demand. While our forest and other fuel supply is being burned, another is growing and something forming to keep up the balance.

In Nature nothing is lost, neither can there be increase; design is limitless, and resources inexhaustible; duplicates are never known in form, species, features, and thoughts; thus showing one of Nature's most positive laws, that mankind shall not accept one central thought, creed, or purpose to be universally followed, as such an order of things would entirely preclude the writing of the few hints herein offered, as the encouragement of any new device for man's benefit of body or mind, thus leaving everything in a state of stagnation wherein thrift, learning, and progress would be unknown.

Nature never repeats her works, and no two grains of sand or flakes of snow have ever been exactly alike, or ever motionless. Motion causes friction. Friction produces heat. Heat produces life.

XVII.
SCIENTIFIC THEORIES.

The Mediterranean Sea, a body of water between Europe and Africa, nearly 2,000 miles in length, surrounded with most of the noted cities of antiquity, has remained during these thousands of years in an unchanged condition from tides, inundations, or any other disturbing causes. Into this sea through the Strait of Gibraltar has been flowing all this time from the Atlantic Ocean, a river 15 miles wide with an average depth of one and one-fourth miles. This river is reported to have so strong a current that a sailing vessel has difficulty of coming out against it without the help of a favorable east wind. This is a sufficient flow of water to fill the basin of the sea almost yearly, besides the help of all the rivers of Southern Europe and Northern Africa. The reason of no change is given for its location, where evaporation carries off all this influx of water; while some think an undercurrent must exist back into the Atlantic. The first reason seems too ridiculous for a child to give. The water of the Atlantic is so salt as to produce over a pound of salt to a common bucket full. If evaporation is the reason of its equable condition, there could be no other result than a mountain of salt big as the Himalayas long before this time.

The claim of a countercurrent is almost as absurd. That the sea discharges its waters in an undercurrent which passes through the neighborhood of the Caspian and Aral Seas, is more likely than that the waters run backward against a powerful current from the Atlantic and against the centrifugal force that governs the movements of relatively every other water course on the Earth.

So much for that subject for any criticisms that may be offered. Intervening lakes between the Caspian and Aral Seas, seasonably fill with salt water, from the evaporation of which immense bodies of salt are gathered. Where does this supply of salt water come from to leave hundreds of thousands of tons of salt each year?

XVIII.
SURFACE INFLUENCES OF WATER, AND CHANGE OF POLARITY.

Very little thought or attention is paid to the insidious changes produced by water on the Earth's surface.

Not a day passes, or has gone by, but that a large quantity of material is transferred from one locality to another. Every shower carries from some higher point to a lower, and a certain amount of drift goes toward some ocean. Small streams contribute to the larger ones, and all lead to the great ocean reservoirs. In going across our country many important evidences are to be seen of the immensity of work accomplished by water, in the removal of vast areas and depths of land.

One of the most noticeable and apparent seen by the writer is in the valley of the Rio Grande, in passing through New Mexico and at some other points. For more than 100 miles through this valley in the spring and summer you seem to be following an ordinary creek that gives little idea of the importance attached to such a stream as the Rio del Norte. You see a stream, only thirty or forty feet wide, with steep, abrupt banks, of a sort of adobe soil, some six to ten feet high.

At various places, if you observe, in the bends of the stream these perpendicular banks of earth will be caved off into the water, at frequent intervals. When the next annual freshet comes this loosened earth is carried away toward the Gulf of Mexico, and portions of it reach there while other parts will be lodged at different points on the way.

Now this visible, and natural process, has been going on for ages, and the effect of this incessant work and stupendous result is to be seen far as the eye can reach for hundred of miles.

Here follow the proofs of this long and diligent labor. In all directions you see hills, or immense mounds of land, like inverted deep pans, with flat bottoms, of all sizes, so that their flat tops would include from one acre to hundreds. These mounds all have quite precipitous sides, subject to the wash of every rainy season. As you study the character of these high mounds you will soon be convinced they are not upheavals, as their tops in all directions seem to have a common level. Among these mounds will be occasional ones that have been washed away to a point, and here and there one reduced to half its original height. These hill-tops, if they may be so called, were beyond doubt, at some very remote time in the past, the common level of the country for hundreds of miles, and as they will average 100 feet high or more, it is beyond the power of conjecture to estimate the time required to wash all the vast area away that once existed to make up the level of this valley.

Another similar exhibition is at and near River Falls, in Wisconsin, a town on the east bank of the Mississippi, some thirty miles east of St. Paul. Here the same occurrence seems to have taken place, of a washing away of the greatest bulk of the land, and leaving similar mounds with their flat tops, on many of which are quite extensive farms, approached by very precipitous roads at some favorable point on their sides. These mounds seem to have different strata of soft rock, on which they stand, the lowest and thickest of gray sandstone, quite soft, and must, with the others, be gradually wasting away by frosts, and other agencies to disintegrate. Only one yellowish stratum is strong enough to be used for some building purposes.

While there are hundreds of these mounds that must have once been the level of the whole country, that which is now left is a very level and fertile soil, producing some of the finest wheat, and best quality of potatoes in the State.

These instances are only two out of thousands of a similar nature in this country and all over the world.

The tendency of this drift is mostly as the streams of water run toward the Equator or center of greatest motion.

The vast deserts and other accumulations of sand on the Earth are only the deposits of ancient rivers into then existing seas, which by later surface upheavals, by interior hydraulic forces, have been transferred to other beds, and the deserts like Sahara, Atacama, Mojave, and the Steppes of Asiatic

Tartary, remain as evidences.

By these enormous changes of soil it seems rational to believe the uniform and unvarying revolution of the Earth could hardly be possible, and that more or less change during great length of years must be made in form as well as time of revolving. Have not both occurred? Riding down the Quinnipiac Valley to New Haven, Conn., a man is likely to inquire in his mind where those sand plains came from. Some think the Connecticut once flowed there, some the Niagara or St. Lawrence; if so, where did they bring the sand from?

Think of the change bound to come in the future, when the Falls of Niagara cut their way back to Lake Erie, thus letting out its waters, enough to construct it into a large river.

Some channel has evidently been lowered to settle the surface of Lake Michigan, as can be plainly seen in leaving Chicago by boat, that the waters on the western banks were once twenty or more feet above present level. Either the lake has settled or the land has risen. As deserts are nearly all below the ocean surface, is it not presumable that this enormous accumulation of sand has had the effect of such depression, while the transference from other localities has thinned Earth's crust enough to make easy the internal water pressure to lift up the hills and mountains, through which the great water courses of the Earth are supplied? Think of the transportation of soil to the deltas of the Mississippi, Amazon, Ganges and other rivers amounting to millions and millions of tons every year, and imagine when the time will come when the Earth approaches the form of a wheel, or ring, nearer than a globe, and become a small imitation of Saturn.

Assuming that this is, and has been one cause of the great upheavals, is it not suggestive that the original of the Earth's surface in its formation millions of years past, was nearly or quite free from hills, and mountains, and the inside as well as exterior has been undergoing radical changes?

Great masses of earth on the outside accumulated by floods and washed from higher points have dammed up and smothered the flow from inside, while the sections of the Earth that have contributed to this mass have been thrown up into exterior mountains, and the depressions made inheavals to a corresponding extent.

From this reasoning it might appear why Africa and Australia, with their vast

area of deserts, are less supplied with rivers and lakes proportionally to other continents; the same deficiency of mountains being noticeable. On the other hand, the rest of the continents and islands abound in mountains, lakes, springs and rivers. The great present groups of Islands of Oceanica, will, perhaps, in the distant future, all be joined to one mass, and while they may rise higher, others in present use may sink.

The legend of Atlantis may be repeated in some coming age, and perhaps a new Bible story will record the seagoing experience of another Noah; but if so, it is hoped he will have a bigger ship, and better provided with modern improvements and other sanitary arrangements than the old boat seemed to be for so long and important a voyage. From what has been written on surface influence of water is it not reasonable that polar variations must have occurred through the millions of years Mother Earth has been whirling through space? The writer does not assume to know all claimed in this discussion, being an agnostic in this as well as in spiritual knowledge; but if some full-grown scientific giant will rise up and give any more plausible reasons for why things are as they are, I shall be delighted to sit on some little stool and let him thrust the information into my bewildered cranium.

XIX.
CONCLUSION.

The author of this unscientific work has assumed the task to contradict theories that to him have seemed wrong, although long accepted from scientific authorities.

The world is given to taking statements for granted that emanate from some professional man's brain, and published in some newspaper or book, whether of real or fictitious origin.

The stories of Wm. Tell, Robinson Crusoe, Washington and his little hatchet, Jack the Giant Killer, Samson and the foxes, Joseph sold into Egypt, St. Patrick's extermination of toads and snakes, Newton's discovering the "law of gravitation" by an apple dropping on his head, Noah's flood, etc.—all of these and hundreds more have passed for current facts by being oft told. Plain stories and simple unadorned tales have small circulation without lies enough mixed in to make them interesting.

Every age has its learned prodigies and scientific minds that are ready to answer any question and solve all obscure matters. When men of early ages discovered on hills and mountains marine shells and other deposits which showed evidence of the bottom of a sea or ocean, and fossil deposits and footprints in rocks, they naturally inquired of the wise men how they came there. Hence quite likely the story of the flood.

When they asked how the people of Europe were white, Asia, yellow, and Africa, black, the solution was, that Noah had three sons who settled, one in each country and produced such progeny. The geography of the world in those early times represented the Earth as having four corners, and surface flat with "jumping off" places on all sides. It is evident the solvers of this "race problem" had no knowledge of America and Australasia. (Time has developed the fact that they either knew about it and lied, or lost sight of two sons that Noah should have had to represent the red and brown races.) It is expected of us to believe that Japheth was white, and peopled Europe; Shem yellow, and settled down to farming in Asia, and Ham black, and went into

the monkey and elephant business in Africa. Whether the two other boys, the brown one, that raised Malays, and the red one, that bred and introduced the American Indian, were ever married, I never learned, but conclude it was unnecessary, as they seemed to have as good success in settling up their respective countries as the favorite boys that Noah took, with other live stock, on his yachting trip.

Noah should have really been the man to write on the subject about which this paper treats, as his experience on the "cold-water" question must have given him superior advantages over the writer.

There have been conscientious men of all times who have said and done very silly and unwise things, which, at the time and in the age they were enacted, were considered by public and private consent right and just.

The hanging of witches, buying and selling of slaves, the burning of John Rogers at the stake, his wife and nine small children, one at the breast, as spectators, were considered as just and necessary as an act put in force to destroy crows and kill sheep dogs.

As age succeeds age, new ideas crop out, and what to a former generation appeared true and consistent to their successors oft become a subject of criticism and ridicule. It is to be hoped that future minds will take up the subject of this crude work and make as much advance in the development of Earth's mysteries as the modern steamship excels in completeness and power the first attempts of Fulton, or the harmonious modern orchestras the hollow music of a Hindoo tom-tom.

To believe what is here written will not insure eternal joys, or to doubt will not incur Divine wrath, or commit a skeptic into the hands of him who walketh in darkness, or to an eternity of pain or woe.

These modest hints are given with the hope that millions of miles of land on Earth now barren and useless, by tapping the generous fountains of water so wisely stored by Providence, may be turned into gardens of beauty, and furnish fruits and sustenance in plenty for coming generations.

While many look upon the Earth as "a vale of tears," it is the best world we have any reliable knowledge of, and seems well adapted to the wants of animal and vegetable life, if we avail ourselves of the wise and ample

provisions Nature has put in our way.

If there is another and better world to come, it is hard to imagine that pearly gates and golden streets can conduce as much to our comfort, or will be as goodly a heritage as one of “sweet fields arrayed in living green,” with shady groves, blooming gardens, and generous fountains of pure sparkling waters, and not the thirsty abode experienced by Dives.

While on this Earth, Nature has supplied with prodigality for this life’s wants, land and water, light and darkness, floods and drouth, and, as learned from Paul, four kinds of flesh (and he didn’t say how many kinds of vegetables) reptiles, insects, worms, bugs, microbes, poison and its antidotes, good people and bad, heat and cold, salt and fresh water, scientists, cranks and fools, yet with all this profusion of gifts, we would be no better off than Dives in Sheol without the indispensable blessing of water supplied by Symmes’s Hole.

A few more questions and done. Why should sea soundings five miles deep be at temperatures below freezing, if, as is claimed, such a depth in land borings would be in a molten condition, and going much farther the prevailing theory would make hell an ice house in comparison with the Laurentian strata?

Where does the fresh water come from admitted to exist in the bottom of the oceans?

Where is the source of fresh water that abounds in the highlands of islands in all latitudes?

Where does the water come from that feeds all the coral reefs and throws up atolls hundreds of miles in extent and nourishes the roots of trees and smaller vegetation?

Why are the atoll inclosures filled with different varieties of fish from the ocean outside?

Why are most of the great lakes at high elevations and commonly on top of divides?

Why are springs more numerous all over the Earth on the hills and mountains than in the valleys?

Why are the shallowest and most enduring wells on the highlands instead of the low?

Why when a country is below sea level is it a desert?

Why did Abraham succeed with his flocks, while Lot (as he deserved) was dried up and burnt out? Answer, Abraham was the smarter of the two, and took to the hills, where he no doubt had observed the waters lasted.

Where did Moses look for water when his followers were famishing for it? He went where water can almost invariably be found, at the foot of a rocky upheaval which he discovered in Horeb.

How could water be cast up from a deep artesian well, bored on a plain with no high land in sight to produce a pressure claimed in explaining their nature and reasons why they flow?

Where do all the rivers found in large caves have their origin?

Where and how does rain water soak into the ground, turn around and come back again with the force shown in bubbling springs and artesian wells?

Why does moss only grow in unfailing wells, and cresses, peppermint, cattails, and water lilies in living waters?

Why in digging wells anywhere in striking gravel do they always find water?

Why do hills and mountains produce more verdure and forests than the plains?

Why are all the volcanoes extinguished by water?

These questions can none of them be answered by any other hypothesis than through a belief in the existence of Symmes's Hole. Into such a hole sufficient water could flow to supply all the fountains of the Earth, and, what is more, it does flow, and furnishes the wonderful quantities that leap down the mountain sides in stupendous waterfalls, that feed the millions of springs that pour their sweet influences in rippling streams through valleys and meadows. It supplies the great volumes that make Lake Superior and its grand associates in America, and similar great lakes throughout the Earth. Last, but far from least, the phenomenal Gulf Stream that floats the navies and commerce of the world like toys and modifies the climate across an

ocean. To supply such resources needs something more than occasional showers that ordinarily evaporate in forty-eight hours, or than equinoctial or shearing sheep storms, of which nine-tenths of their volume runs into the streams and rapidly to the ocean, the great and general reservoir of supply and distribution.

Having endeavored to explain the philosophy of heat and its cause, also other phenomena in brief, I will conclude by paying tribute to the great exterior waters, for their important participation in Nature's munificent work. The Oceans, after tossing in the fury of the storms and rocking from continent to continent, kissed by tropical winds and frozen by Arctic cold, sunk in caverns, and dashed upon high rocks, after drinking up all the rivers, washing every shore, and visiting every clime, are filtered at the Ice Belt and enter the bowels of the Earth, to come out again by centrifugal force in a fresh and renewed form to contribute to man's necessities in an even greater benefit than when rolling in majestic waves or floating the commerce of the world.

APPENDIX.

To demonstrate the size of icebergs, fields of ice and glaciers.

Ocean depths, different estimates of.

The character of volcanic eruptions respecting material thrown out and final result of filling with water.

For evidences of how long heat will remain when covered after great fires, the same as in old times when people covered the backlog, and to show the reason for judging the interior to be molten when the heat is developed at insignificant depths by friction leading it to a further volcanic development, or else from an extinct volcano from long time past.

Artesian Waters, Caverns, Earthquakes, Gulf Streams, Lakes, Springs, Wells, Islands, etc.

This appendix is added showing cases something in harmony with the arguments here presented on all these subjects, to which could be added several times as many more.

While most of the points intended for a brief discussion in this book have been hit upon, a few words, with some newspaper clippings on mysterious things, are thought best to be added as a sort of appendix, and of such a character as to prove of benefit to some readers that see fit to avail themselves of a few hints to obtain water, for domestic or irrigating purposes, in an easy way, and where they would naturally least expect to find it.

At my old home, on the farm where I was born, our well, some thirty feet deep, nearly every season went dry. I have lugged hundreds of pails of water from neighbors' wells and from a spring near the foot of the hill, one-third of a mile away, during my early life.

The hill is little over a half mile long, and less than one-fourth a mile wide from its furthest bases. It is shaped like a box turtle, rising 100 feet or more. There used to be a place near the top, on the east slope, that looked springy. The recent owner, a few years ago, dug into this wet spot, and at a few feet

found living water, which is now piped to his house and barns in plenty.

Some years ago my cousin owned the adjoining farm on the north end of this hill, and employed a man to blast out several large iron rocks, scattered about on the surface of the hill. One of these rocks, nearly a rod square, lay almost exactly on the highest part of the hill. This big rock was full of large cracks, which, in my boyhood, I took a young visitor to see, explaining to him that these cracks, no doubt, occurred at the time of the crucifixion, of which pious information I was frequently reminded in later life. This rock was some eight feet deep in the ground. When the last blocks were hauled out the space partly filled with clear water, so cold that it was made available for drinking. Being in the dryest time of the year, the supply appeared to be permanent, which induced the laying of pipes one-third of a mile to barns for watering stock, which before had to be drawn mostly from the wells.

A man in the town of Durham—Henry Page—for years obtained water for his house and stock by a hydraulic ram; but, getting a new idea, took advantage of a knoll, shaped like an inverted bowl, an acre or two in extent, lying across a field some forty rods from his house. He dug into the top of this knoll some fifteen feet, striking plenty of water, which was easily piped all over his premises in abundant supply. West of his home rose the Besek Mountain, in a gradual rise for three-fourths of a mile, where it stopped in precipitous ledges, on the west side, nearly 200 feet high. I have hunted up to the top of these ledges. Near the top of the mountain is quite a section of swamp, and nearby descending is a spring that runs a short distance, falling over a shelving rock, and in two or three rods more is lost in the loose stones. It is there in the dryest seasons. Similar to this is a lake on Talcott Mountain, a short distance from Wadsworth Tower, and only a few rods from the abrupt ledges that overlook the towns of Simsbury and Farmington. Hundreds of such cases are in evidence all over the country, and it is quite sure that a large majority of those interested by reading this book will think of various similar cases that have been a query in their minds, “Why they were so.”

While a great number of peculiar features of this kind can be recorded, I will take time to relate a case or two farther from home.

My cousin, who took the Scripture lesson of the rock and its rendings, spent his last days in Southern California, where springs are rare, and orange groves and vineyards depend greatly upon irrigating for water. He was

located at Duarte, about twenty miles east of the city of Los Angeles, in one of the finest orange and lemon groves in the State. While they had provisions for irrigating, the lack of drinking water was seriously felt.

Visiting at my house some twenty years ago, where he chiefly made his Eastern home, he listened to my cranky ideas as set forth in this work. At first he scoffed, but being a good reasoner, he afterward thought the idea worth trying, and promised on his return to experiment and report, as I had convinced him of several successes here. In less than a month I got word from him that "he had struck it." The grove lay at the foot of the San Gabriel Mountain, not one-quarter of a mile away. I advised him to select some place in the side of the mountain where the tree growth was greenest, which he did, and got all the pure water needed.

A Mr. Fitzgerald, owning a large grove about a mile west, similarly located, took the hint and obtained quite a favorable result. When visiting these groves in 1894, almost the first thing Mr. Fitzgerald wanted to show me was his bountiful supply of spring water, tapped from the side of the mountain. These hints and cases are related as suggestions to any reader who may wish to better his water supply. Don't go into the low ground for it, but tap the hills and high lands, where all the fountains of the earth are in abundance.

In Southern California three seasons out of four the plains and valley lands become too dry for pasturage of cattle and horses and bands of sheep, and a general hegira is made toward the mountains. While the Winter rains swell the streams running to the coast, filling their banks with rushing waters, by May and June a buggy can be hauled through every stream from San Francisco to San Diego without wetting the hubs of the wheels. The small streams are all dried up, and water for stock rare to find. As you go toward the mountains you meet the series of foothills like inverted bowls, the tops of which show growth of bulrushes and fleur de lis. At the foot of the hills will be found some of the drippings from the streams starting farther back. As these hills rise in groups, higher and higher toward the mountains, the green tops show more and more, and the streams increase in volume, affording good fishing for trout. Standing on the tops of these sugar loaf formations in the grazing season, one is reminded of Abraham's herds of cattle on a thousand hills, to be seen as far as the eye can reach. In southern Minnesota is a long range of highlands thrown up, which they term a mountain chain, but

scarcely anywhere is there an upheaval of rocks or any ledges. Over this range every Spring and Fall season will be seen thousands of flocks of ducks, brant, wild geese and sand hill cranes. The springs do not gush out in streams as from rocky formations, but ooze up into great mounds, frequently involving an acre or more, like a great conical sponge, up the side of which you can walk, the water gushing out under every footstep, giving an impression that you may sink in all the way to the top, where you will find an open spring several feet across, the water from which seems to be absorbed by this spongy mound of earth and vegetation, so that a stream rarely runs away. This ridge being the highest land in sight, where does this water come from? In a country surrounding which, it is necessary to carry water in kegs for the dogs to drink when hunting over it.

The conclusion of this work will be made up of a variety of clippings from newspapers for several years past, of which these are a small part. These clippings are published as seeming mysteries, but which, by the adoption of the theory promulgated of a hollow earth holding an ocean of fresh waters, seem easy of solution. If any other method can be suggested to answer these puzzling questions, it is to be hoped some genius will reveal it. If the assertions made in this book are true, polar expeditions are and will continue to be as futile as an attempt to signal the inhabitants of Mars, or to get up a correspondence with the man in the moon. Not presuming to exhaust this subject in so brief a treatise, the field is left open, and large enough for the thoughts and observations of men of greater ability to discuss than yours truly.

IMMENSE FIELDS OF ICE.

A STEAMER SURROUNDED AND COMPELLED TO WORK HER WAY OUT.

MONTREAL, May 22.—The steamer Fremona, from New Castle, which arrived here yesterday, had a very startling experience with the ice about 150 miles on the other side of Cape Ray. The vessel was steaming slowly through a dense fog on Wednesday last, when she got right in the midst of a pack of ice, which was drifting southward with the Arctic current. After the steamer had been pounding about in the ice for some hours the fog lifted and showed the vessel to be in a dangerous position. All around her were heavy hummocks of ice, ten feet deep in the water and showing about a foot above

the surface. Gradually nearing the steamer and crushing the smaller pieces of ice in their way were a number of huge icebergs. The captain and chief officer climbed to the masthead and found that the ice extended on all sides as far as the eye could see. There were hundreds of seals on the ice, some of them being close to the vessel. Two hours were spent in turning the steamer, and she was then headed southward and was worked out of the ice. Owing to the movement of such a large mass of ice southward it is feared that navigation will be seriously interfered with.

News from the whalers in the Antarctic Seas on February 17 was that up to that time the whaling had proved a failure, with all the ships that made the venture. There were plenty of whales of the finner and humpback kind, but none of the Greenland kind. Grampuses were too plentiful. Seals were very numerous, and there were also plenty of sea lions. Some icebergs of enormous size were seen; one was fifty miles long and several were from fifteen to twenty.

In the Antarctic Ocean the icebergs that have been noticed from time to time rose 400, 580, 700 and even 1,000 feet above the water, and were from three to five miles long. Their enormous bulk may be inferred from the fact that the part under water is about seven times as large as that above.

PASSED A GREAT ICEBERG.

LONDON, Dec. 9.—The British steamship Galgate reports ice in the South Atlantic. On September 28, in latitude 49 degrees south, longitude 42 degrees west, the Galgate passed an iceberg two miles long and 250 feet high. Hundreds of other icebergs were also seen.

THREE HUNDRED MILES OF ICE.

ST. JOHN'S, N. F., Feb. 12.—The British steamer Dahome, which left Halifax on the 9th for this port and Liverpool, arrived here to-day. She reports coming through a field of ice three hundred miles long. This is something unprecedented at this season.

THE GREATEST OCEAN DEPTH.

The greatest known depth of the ocean is midway between the Island of

Tristan d'Acunha and the mouth of the Rio de la Plata. The bottom was there reached at a depth of 40,236 feet, or eight and three-quarter miles, exceeding by more than 17,000 feet the height of Mount Everest, the loftiest mountain in the world. In the North Atlantic Ocean, south of Newfoundland, soundings have been made to a depth of 4,580 fathoms, or 37,480 feet, while depths equaling 34,000 feet, or six and a half miles, are reported south of the Bermuda Islands. The average depth of the Pacific Ocean between Japan and California is a little over 2,000 fathoms; between Chili and the Sandwich Islands, 2,500 fathoms; and between Chili and New Zealand, 1,500 fathoms. The average depth of all the oceans is from 2,000 to 2,500 fathoms.

Russian reports say that the Sea of Aral has been steadily rising since 1891. The sea level is now four feet above that of 1874. The line of railroad from Orenburg to Tashkend had to be changed in order to avoid being overflowed. Instead of sinking three inches a year, as German geographers had computed, the sea has been rising at the rate of four inches a year for the last ten years.

In 1812 it was La Souffrière, adjacent to the Morne Garou, which broke loose on the Island of St. Vincent, and it is the same Souffrière which now has devastated the island and is bombarding Kingston with rocks, lava and ashes.

The old crater of Morne Garou has long been extinct, and, like the old crater of Mont Pelee, near St. Pierre, it had far down in its depths, surrounded by sheer cliffs from 500 to 800 feet high, a lake.

Glimpses of the lake of Morne Garou were difficult to get, owing to the thick verdure growing about the dangerous edges of the precipices, but those who have seen it describe it as a beautiful sheet of deep blue water.

THE SUN'S TEMPERATURE.

F. R. (Minneapolis, Minn.): Has the temperature of the sun been established? And, if so, what is it?

The following figures are given by the principal scientists who studied the solar temperature: Newton, 1,669,000 degrees Alsius; Pouillet, 1,461; Zollner, 102,000; Secchi, 5,344,840; Ericson, 2,726,700; Fizeau, 7,500; Walerston, 9,000,000; Abney and Fessing, 12,700; Wilson and Gray, 8,700; Pernter, 30,000; Sporer, 27,000; Sainte-Claire Deville, 2,500; Soret, 5,801,846; Vicair, 1,398; Violle, 1,500; Rosetti, 20,000; Langley, 8,333,000;

Ebert, 40,000; Guillaume and Christiansen, 6,000; Paschen, 5,000.

SAW TREMENDOUS ICEBERGS.

THEY ARE 300 FEET HIGH AND SEVEN AND EIGHT MILES LONG NEAR CAPE HORN.

SAN FRANCISCO, Nov. 20.—French sailing vessels making port from around Cape Horn hold the record for sighting huge icebergs. The French bark Eugenie Fautrel, from Hamburg, reported that on September 14, near Cape Horn, a berg seven miles long and 300 feet high was seen several miles distant on the port bow. Now comes the French bark Anne De Bretagne, 164 days from Cardiff, and reports that she not only saw a berg 300 feet high and eight miles long, but she had to sheer off to keep from wrecking herself against it.

It was seen on September 3, and after passing through a great mass of ice, the Bretagne suddenly came within sight of the giant, harmless enough in appearance through the soft mist, but with terribly jagged comers, and a breadth of front that made the Frenchmen quail.

KINGSTOWN COVERED WITH ASHES.

It was seen then that the volcano was in constant eruption, and there was a tremendous roar. Forked lightning played incessantly over the disturbed section. The flashes averaged from sixty to one hundred a minute.

Kingstown, which is twelve miles from the volcano, was covered with three inches of ashes and showers of stones on Thursday. The bed of the old volcano was then a lake three miles across.

ERUPTION STARTED ON MONDAY.

The eruption was first observed on Monday. Huge flames of water shot up, and the people in that district fled. There has been a continuous roar ever since.

The northern district, from Chateau Belair to Georgetown, has been completely destroyed. It is impossible to proceed beyond that point, on account of the rivers of lava. A huge hill was observed where previously there had been a valley. The whole of that part of the island is smoking.

SIXTY KILLED BY LIGHTNING.

Sixty persons are reported to have been killed by lightning while getting away.

On Tuesday and Wednesday the island was showered with ashes. Near Belair the ashes were three feet deep.

On Thursday there was a continuous shower of hot sand and water. Everything on the island was ruined by the ashes.

SOME PERSONS DYING OF THIRST.

Many persons were brought in boats from Kingstown. Some of the refugees who arrived on the coast were dying of thirst.

THE NEW JACKSONVILLE.

A FRESH CITY BUILT BEFORE THE RUINS OF THE OLD HAVE CEASED TO SMOULDER.

Before the fire that destroyed a great part of the city of Jacksonville, Fla., had ceased to burn, the city has practically been rebuilt. This statement not only describes a building operation remarkable for rapid execution, but also covers an incident unique in the experience of firemen.

Jacksonville was almost wiped out by fire on May 3 of last year. An area of 443 acres, comprising 148 blocks, was swept by the flames, and property worth at least $15,000,000 was destroyed.

The work of rebuilding on a better and more substantial scale was started within a week and has since gone on with rapidity unprecedented in Southern building operations, and now the city is in far better shape than it was before the fire.

About three weeks ago the clearing up of the last of the ruins was begun. The laborers doing the work removed three or four inches of the mass of brick and stones on top, and then found, to their surprise, that underneath the ruins were still hot.

Smoke began to rise out of the hole they had dug out, and the farther down they went the hotter became the ruins, and the thicker the smoke. At last a

mass of red hot coals was found, which sprang into flame when the air reached it.

It had been necessary several times within the year for the fire department to soak this part of the ruins with water, but it had been thought for several months that the fire must be out at last.

Alongside new Jacksonville had already sprung into existence. Six months after the destruction of the city a new one already covered the greater part of the site.

Within eleven months more than 2,000 buildings were erected, fifty of them aggregating in cost $2,000,000. And the new Jacksonville is immeasurably superior to the old.

A PRAIRIE CAVERN.

AN INTERESTING HOLE IN THE GROUND WHERE CAVES WOULD NOT BE LOOKED FOR.

From the Oklahoma State Capital.

SULPHUR SPRINGS, I. T., Oct. 18.—At a spot eleven miles southeast of this place, in the level prairie upland, is an opening about forty feet in diameter and sixty feet in depth. By clinging to its rocky and precipitous walls, a person may descend to the bottom, and there find the openings to the two caves, one leading westward, and the other two to the east. For years this place has been known as Rock Prairie Cave. It is one of the most striking natural curiosities in the Chickasaw nation. The caves are of unknown length, and through one rushes a subterranean stream of great depth in places and of icy coldness. Exploring parties have ventured into these labyrinths for hundreds of yards, but the danger of becoming lost has prevented a thorough examination of the underground passages.

The cave leading westward is easiest of access and contains a number of spacious chambers. The room is about seventy feet square and fifty feet from the floor to the ceiling. The floor is obstructed with huge boulders. The darkness and stillness are intense. Picnic parties sometimes go there, and, with a huge boulder for a table, eat their lunch in the glare of torches that cast uncanny shadows along the massive walls.

Timid persons hesitate in venturing into the depths of the eastern cave. The passage slants downward at an angle that compels the explorer to crawl and slip and slide for nearly 100 feet before reaching a spot where a person may stand upright and walk safely. From the darkness echoes the sound of rushing water, which later is found to be a stream that runs from eight to thirty feet in width, and from six inches to many feet in depth. Men have waded in the stream until the water reached their chins, and then gone in a boat to points where they were unable to touch bottom with the longest oars. A farmer carried his boat into the cave several years ago to follow the stream to its end. At a depth estimated to be 200 feet below the surface of the ground is a natural bridge, formed by a huge stone that fell across the stream. The water plunges underneath this bridge like a millrace. A boat can be pulled over the bridge, however, and launched on the other side. About 100 feet below the bridge the stream widens into a broad, deep pool, with a high, vaulted roof. Beautiful stalagmites and stalactites adorn this chamber. Two hundred feet below this pool the passage is difficult. It is claimed that this cave has been explored for a mile.

The stream is believed to find its outlet at a spring about three miles from the entrance to the caves. This spring is of great size and volume, and flows with remarkable swiftness. In rainy seasons the spring boils and gushes as if choked with the flood of water that pours from its mouth. The stream in Black Prairie cave rises when there is a heavy rainfall in the surrounding country, and the increased flow of both springs and stream at such times is taken as evidence that they are connected.

ARTESIAN WATERS IN TEXAS.

In the south central part of Texas is an upland covering an area of 14,000 square miles, and known as the Edwards Plateau. At the southeastern foot of this elevated tract there is no end of gushing springs, which form the headwaters of the San Antonio and San Marcos rivers. In a big State like Texas, the rainfall of one locality often varies a good deal from that of adjacent regions. But, according to a bulletin of the United States Geological Survey, the fluctuations of discharge of the streams just mentioned correspond closely to the rainfall up on the plateau, from which it is inferred that some invisible connection exists between the springs and the upland. The bulletin declares that this similarity has been found to hold true for dry and

wet years alike. The Edwards Plateau is a flat, grass covered upland. The rain which falls upon it does not flow off in surface streams, but sinks into the porous soil, and eventually finds its way underground to the bold scarp line of the region, where it bursts out in abundant springs.

The San Antonio River has its source in one of these artesian springs, and between it and the wells driven to supply water to the city of San Antonio there seems to be close connection, shown in their mutual changes, which indicates that their waters have a common source. It was recently noticed that when the wells were steadily drawn upon for twenty-four hours the water level of the head lake of the river fell several inches, but that on shutting off the wells the lake regained its level in about one day. So intimate is the relation between the flow of the wells and that of the river that it is always possible to tell how high the water will rise in the former by observing the river's height on a gauge rod placed upon its bank.

THE GREAT ASSAM EARTHQUAKE.

A thorough report of the earthquake in Assam, in 1897, the most violent and extended earthquake of historic times, has been made by Mr. R. D. Oldham. From an abstract by Prof. Davis of Harvard University, it appears that an area of 150,000 square miles was laid in ruins, all means of communication interrupted, the hills rent asunder and cast down in the landslips, the plains fissured and riddled with vents from which sand and water poured forth in astounding quantities, causing floods in the rivers, etc. A surrounding area of 1,750,000 square miles felt a shock of unusual energy. The earthquake wave traveled at the rate of 120 miles a minute. The vertical displacement of the ground near the center of disturbance was probably as much as fourteen inches—an unprecedented quantity; the vertical movement of earthquakes of great violence, like the Charleston earthquake, is seldom more than two inches.

Some of the results of this great earthquake of June 12, 1897, are astonishing. Faults were produced, one having a throw of 25 feet and a length of 12 miles; another a throw of 10 feet and a length of 2½ miles. The larger of the two dammed a river so as to form a lake several miles in extent and ruining a forest of at least 50,000 trees. Landslides of great magnitude were produced in the Himalayas and the valleys of streams were changed beyond

recognition.

CURIOUS RESULT OF THE EARTHQUAKE.

INDIANAPOLIS, Nov. 1.—An interesting point in connection with the earthquake which was felt in this city yesterday is the fact that a number of small Indiana streams having their source in the southern border of the gas belt have suddenly filled with water. No rains have occurred in this State for months to swell the streams, and in the case of Honey Creek, in the eastern part of Bartholemew County, it had gone dry several weeks ago, the water standing only in pools here and there. This week it is filled to the brim, and in some places has overflowed. Sugar Creek, that runs near Edinburg, Johnson County, was nearly dry, but to-day it is reported to be nearly filled. Smaller streams rising in the Hancock County gas territory have shown similar phenomena. No one can imagine where the water comes from. In the case of Honey Creek the records show that previous to the Charleston earthquake, August 31, 1886, the stream acted in the same way.

A VILLAGE DESTROYED BY AN EARTHQUAKE.

CONSTANTINOPLE, May 27.—The village of Repahie in Armenia has been destroyed by an earthquake. A number of mineral springs spouted from the crevasses made in the earth by the shocks and the flow of water was so great that the adjacent fields were flooded. The earthquake was preceded by rumblings which caused the inhabitants to flee from the village and they thus escaped death from the falling houses. No lives were lost however.

Since a recent earthquake at Santa Ana, in Orange County, Cal., the well of Mr. Huntington in Los Bolsas district, which for years has never flowed to any considerable extent, has given forth large quantities of mud, stones and other materials, the eruptions being volcanic in character. The supply of water is now far in excess of the means provided at the surface for its care, and it has been found necessary to ditch from the well to the river to carry it away. The pipes are at all times in danger of bursting—the sudden blasts of air and foreign substances rendering it more or less dangerous to go near the opening.

FIRE BANKED FOR YEARS.

From the Galveston Daily News.

ORANGE, Tex., Feb. 21.—J. W. Link is filling in some low lots with ashes and charcoal that he is hauling from the pit where A. Gilmer at one time burned the slabs and refuse that came from his sawmill. The mill was destroyed by fire Sept. 13, 1899. When the wagons commenced hauling the mound of ashes was 20 feet high and nearly 40 feet in diameter at the bottom, tapering as it went up.

To-day when the men had worked in about 15 feet, but before they had reached the center of the heap, the teamsters discovered smoke issuing from the charcoal as it was being brought in contact with the air. One of them felt of his shovel and was startled to find it very hot. He picked up a piece of charcoal and blew it with his breath, when it developed into a blaze of fire. The experiment was repeated several times to-day and each time the charred lump would become a live coal. The ashes were about 16 feet thick that stood above the live coals, and from the outer edge to where the hot ashes were first discovered, a little above the ground the fine ashes were fully as thick.

No smoke has been seen to come from the big ash pile for nearly two and a half years, and these coals have been in their present resting place probably for a longer period, as the cone-shaped mound was much larger when the mill was destroyed than it was at the time the wagons commenced removing the ashes.

The Volcano of Kilauea is very active at present. The cavity produced by the last breakdown has not filled up, but there is an active lake 200 to 300 feet below the general level of the floor and a quarter of a mile in diameter.

A WHOLE VALLEY LAID IN WASTE.

FIFTEEN CRATERS DESTROY WHAT WAS ONCE A DELIGHTFUL SPOT.

LUNAHUANA, United States of Colombia, March 30, 1891.—This beautiful valley has experienced a topographical change, and I may now call a desert that which was formerly a delightful spot. Fifteen craters have been constantly at work since Sunday, March 22, throwing out masses of mud and

water which on its precipitate descent and with the great strength of the current, is carrying ruin in all directions and sweeping houses before it, together with their inhabitants and the cattle, vineyards, farms and irrigation works.

All the roads north and south of here have been converted into ditches, through which the water is continually pouring, and all communication between Canete and Chincha is interrupted, while the bridge across the river has been swept away.

The numerous victims who have suffered, the deep impression caused by the destruction of all the irrigation ditches, the fact that it will be impossible to gather the remainder of the crop of grapes, and the certainty that the necessities of life will reach famine prices, lead me to suggest that the government should take steps on behalf of the residents here. Hundreds of families have been left without homes and are camping out on the hillsides, the only clothes they have being those in which they escaped. They are preparing to cross the ravines, as the floods may sweep down upon them at any moment.

An interesting geological phenomenon is noticed in the district of Izium, in Kharkoy, Russia. In consequence of the heat this summer the ground broke open in many places and deep ditches formed, at the bottom of which subterranean water appeared. Geologists who examined the ground think that the subterranean water comes from the same source which supplies the Slavinskoye salt lakes of the neighborhood.

A HIVE OF VOLCANOES.

OVER THREE THOUSAND ACTIVE VOLCANOES IN LOWER CALIFORNIA.

SAN DIEGO, Cal., July 25.—The San Diegan to-day publishes a descriptive account by Colonel I. K. Allen, the well-known engineer, of a phenomena in what is known as the volcano region of the Cocapah Mountains, situated sixty-five miles southwest of Yuma in Lower California. Colonel Allen says there are over three thousand active volcanoes there, one-half of which are small cones, ten or twelve feet at the base, the remaining half five to forty feet at the base, and fifteen to twenty-five in height. The whole volcanic region is encrusted with sulphur. One peculiar feature of the region is a lake

of water jet black, which is a quarter of a mile in length and an eighth of a mile in width, seemingly bottomless. The water is hot and salty.

A TUNNEL A LIME KILN.

THE SANTA FE MAY HAVE TO ABANDON ITS JOHNSON CANYON ROUTE.

LOS ANGELES, Cal., Jan. 31.—The Fairview tunnel through the mountains at Johnson's canyon, near Williams, Ariz., is again on fire and the officials of the Santa Fe Pacific fear that they may be compelled to abandon the tunnel, as they are at a loss to devise means to extinguish the flames. Investigation shows conclusively that the new fire was caused by spontaneous combustion. The tunnel is now nothing but the flue for an immense lime kiln. The mountain through which the tunnel passes is chiefly limestone of a high degree of purity.

VOLCANIC OUTBURST PROBABLE.

SAN FRANCISCO, Cal., July 1.—News from Susanville, in the Sierra Nevadas, says that slight earthquake shocks continue and that the people have been so accustomed to the constant trembling of the earth that they pay no attention to it. The shocks, however, have revived recollections of old settlers who predict volcanic disturbances in the extinct craters, such as there were in 1850.

Susanville lies in a highly mountainous walled valley directly east of Lassen Butte, an extinct volcano 10,000 feet high. From its summit no less than forty extinct craters can be seen. Cinder Cone, which rises 600 feet above the level of the plateau, was in eruption in 1850. Two prospectors examined it and found Lake Saltafara, miles south of Cinder Cone, a center of volcanic forces. The lake was a mass of boiling water and mud and from it vast columns of flames shot up at intervals. The timber in the vicinity was on fire. Within the last few years there has seemed renewed activity in the internal fires and the present shocks point to the possibility of another great volcanic outburst which will find vent through some of the old craters.

DESOLATED BY ERUPTIONS.

FIFTEEN NEW CRATERS DESTROY MANY HOMES AND RUIN A

WIDE AREA IN CHILI.

PANAMA, April 26.—Regarding the eruptions in the Lunahuana district of Chili, the Lima *Opinion National* has published the following letter dated March 30:

"This beautiful valley has experienced a topographical change, and I may now call a desert that which was formerly a delightful spot. Fifteen craters have been continually at work since Sunday, the 22d, throwing out masses of mud, which, in its precipitate descent and with the monstrous strength of the current, is carrying ruin in all directions and sweeping houses before it, together with their inhabitants and the cattle, vineyards, farms, and irrigation works. All the roads north and south of here have been converted into ditches, through which water is continually pouring, and all communication between Canete and Chincha is interrupted, while the bridge across the river has been swept away. Hundreds of families have been left without homes and are camping out on the hillsides, the only clothes they have being those in which they escaped. They are preparing to cross the ravines, as the floods may sweep down upon them at any moment."

GLACIER ICE.

Glacier ice is not like the solid blue ice on the surface of the water, but consists of granules joined together by an intricate network of capillary water, filled fissures. In exposed sections and upon the surface of the ice can be observed "veined" or "banded" structure veins of a denser blue color alternating with those of a lighter shade containing air bubbles. The cause of this peculiar structure has been the subject of much theorizing among investigators, but hitherto the greatest authorities consider that the explanation of the phenomenon is yet wanting.—*Goldthwaite's Geographical Magazine.*

THE LONGEST GLACIER IN THE TEMPERATE ZONE ASCENDED BY MR. CONWAY.

Mr. W. M. Conway, who was sent out by the Royal Geographical Society of London last spring to explore the Kara Koram Mountains and their mighty

glaciers north of Cashmere, has accomplished the most brilliant feats of mountain and glacier climbing that any explorer has achieved in years. He has sent to the society a report of his ascent of the Baltoro glacier, over forty miles in length and the longest glacier that is known in temperate regions, and of his ascent of an ice-covered mountain over 23,000 feet high at the upper end of the glacier.

He began the ascent of the Baltoro glacier on Aug. 5. He had little idea on starting of the discomforts before him. His party included three Englishmen besides himself, an Alpine guide, and four Sepoys detailed from an Indian regiment. Fully two-thirds of the entire length of the glacier was so completely covered with stone debris that the ice was not visible except where lakes or crevasses occurred. He was unable to ascend along the banks at the sides of the glacier, for they were not traversable. He was therefore forced to go up the horrible middle of the ice. The surface was not flat, but was a series of prodigious mounds. He measured one of them, which was over 200 feet high, and it was usually easier to climb over these mounds than to circumvent them. The stones that rested upon the ice were constantly giving way under foot. The consequence was that the progress of the heavily laden Sepoys was slow and the marches had to be short.

The party was nearly two weeks ascending this icy river, four days of which time they remained in camp on account of stormy weather. When they finally turned up a tributary glacier in order to ascend the mountain, they had reached a height of 16,000 feet above the sea. All through the journey the cold was very severe. The party was very heavily laden because in addition to their food supplies it was necessary to carry a quantity of fuel.

It was not until Aug. 25, twenty days after they had left the foot of the glacier, that they began the assaults upon the icy peak which they intended to surmount. Two or three of the party had become disabled by cold and fatigue, and had to return to a camp established on the glacier. The party complained of some discomforts which travelers among the Himalayas have often mentioned. The sun, day after day came out with scorching power, and while their feet were numbed with cold, their bodies were far too hot to be comfortable. Mr. Conway says the great variations between biting cold and grilling heat are the chief impediments to mountaineering at high altitudes in those regions. Not only the cold and the heat alike are hard to endure, but the

change from one to the other seems to weaken the forces and render the whole body feeble.

Ascending the steep slope of the final peak, their climbing irons were of the greatest assistance. They found to their dismay after climbing a few hundred feet that the upper part of *the peak was not of snow, but of hard, blue ice, covered with a thin layer of snow. Every step they took had to be cut through the snow into the ice. The ice was too hard for the steel points of the climbing irons to penetrate until it had been prepared by a stroke or two of the ax.* The Alpine guide said the work of step cutting was far more fatiguing than he had ever experienced in Switzerland. One of the Sepoys was overtaken by mountain sickness and had to be left behind. Now and then a puff of air inspired the party with a little life. Most of the time they suffered from the rarefication of the air.

Reaching the top, about 23,000 feet above the sea, Conway named the mountain Pioneer Point. He saw the most glorious views on every side. The whole panorama of valley, mountain, glacier, and snow has an effect, at an elevation, of majestic repose. The observers were far above the noises of avalanches and rivers and nature's forces were reduced to mere insignificance as they gazed thousands of feet below them upon the scenery. Many of the mountains they saw had not before been seen by human eye.

ANOTHER GULF STREAM FROM SAME SOURCE.

In many respects the North Pacific ocean resembles the North Atlantic. A great warm current, much like the Gulf Stream, and of equal magnitude, called the Black Stream, or Japan current, runs northward along the eastern shore of Asia. Close to the east coast of Japan it flows through a marine valley which holds the deepest water in the world. It was sounded at a depth of 5¼ miles by the United States steamer Tuscaroa in 1875, while surveying for a projected cable route between the United States and Japan. The heavy sounding weight took more than an hour to sink to the bottom. But trial was made of a chasm yet more profound, where the lead did not fetch it up at all. It is the only depth of ocean that remains unfathomed.—*San Francisco Examiner.*

At the head of Onion Valley, in Inyo County, Cal., are two abrupt mountains, one 13,000 and the other 14,000 feet high. Tumbling down the side of one is a cataract 500 feet high, which in the distance resembles falling snow, and two other waterfalls of equal height are visible from the head of the valley.

THE LAKE ON THE MOUNTAIN.

MR. DRUMMOND THINKS HE HAS FOUND WHERE ITS WATERS COME FROM.

On the north side of Lake Ontario, southwest of the Canadian city of Kingston, is a lake situated on a height of land one side of which forms a cliff. It is just south of the arm of Lake Ontario known as Quinte Bay and it stands 180 feet above the bay. There is no opportunity for surface waters to flow into this little lake and no one has the slightest idea whence it derives its waters, which are clear and fresh. The lake is about one and a half miles long with a width of about three-quarters of a mile.

Mr. A. T. Drummond recently wrote a letter to *Nature*, in which he said he believed he had solved the mystery of the invisible inflow, which cannot possibly be attributed to springs from any higher ground in the neighborhood. In his opinion the source of the lake is to be found in the Trenton limestone area some twenty-five or thirty miles to the northeast. There is a steady rise in these rocks to the north and their dip is favorable to sending the water that sinks through the soil to them southward to the region of Lake Ontario. Fifty miles away the rocks have a height of 400 feet above the lake.

In order to ascertain the bearing of these rocks upon the origin of the inflow, Mr. Drummond last summer made a series of soundings in the little lake. The largest part of the lake is shallow, but along its southern edge he found a great rent in the bottom nearly a mile long and a third of a mile wide. In this rent the depths varied from seventy-five to 100 feet. He says the rent is probably due to a wide fault or breakage in the Trenton limestone, and he believes that the same forces that gave rise to this fault may account for a subterranean connection with the higher ground many miles to the north through which the water finds its way into the little lake that overlooks Ontario. Mr. Drummond’s theory is the most plausible that has yet been suggested to account for the source from which this mysterious lake receives its waters.

A BOILING LAKE.

There is a lake of boiling water in the Island of Dominica, lying in the mountains behind Roseau, and in the valleys surrounding it are many solfataras, or volcanic sulphur vents. In fact, the boiling lake is little better than a crater filled with scalding water, constantly fed by mountain streams, and through which the pent-up gases find vent and are ejected. The temperature of the water on the margins of the lake ranges from 180° to 190° Fahrenheit; in the middle, exactly over the gas vents, it is believed to be about 300°. Where this active action takes place the water is said to rise two, three, or even four feet above the general surface level of the lake, the cone often dividing so that the orifices through which the gas escapes are legion in number. This violent disturbance over the gas jets causes a violent action over the whole surface of the lake, and, though the cones appear to be special vents, the sulphurous vapors rise with equal density over its entire surface. Contrary to what one would naturally suppose, there seems to be in no case violent action of the escaping gases, such as explosions or detonations. The water is of dark gray color, and having been boiled over and over for thousands of years, has become thick and slimy with sulphur. As the inlets to the lake are rapidly closing, it is believed that it will soon assume the character of a geyser or sulphurous crater.—*St. Louis Republic.*

AN UNCANNY LAKE.

There is in Missouri a lake, perched on the top of a mountain, its surface from 50 to 100 feet below the level of the earth surrounding it, fed by no surface streams, untouched by the wind, dead as the sea of Sodom. There is no point of equal altitude from which water could flow within hundreds of miles, and yet it has a periodical rise of 30 feet or over, which is in no way affected by the atmospheric conditions in the country adjacent. It may rain for weeks in Webster County, and the return of fair weather will find Devil's Lake at its lowest point, while it may reach its highest point during a protracted drouth. —*St. Louis Globe-Democrat.*

CURIOUS LAKE IN THE WEST INDIES.

CHICAGO, Oct. 14.—*Editor of the Herald*:—In your very interesting "Missing Links" of to-day you mention the great sunken lake in the Cascade

Mountains as the most deeply sunken lake in the world. This reminded me of a lake similar to this which I visited while traveling in the West Indies in 1891. This lake is situated in the island of St. Vincent on the highest peak of the Souffrière range of mountains, 4,500 feet above the level of the sea.

It is one mile and a half down to the surface of the water and like the Cascade Lake the depth of the water is unknown.

Soundings were taken many years ago by Lieutenant Smith, of the United States navy, but with no result. The lake is almost a complete circle and is about three or four miles in circumference.

The color of the water is light olive, but there are times when it changes to an intense yellow and is saturated with sulphur. It was in the latter state that I saw it in 1891, and so thick was the sulphur that two of our party who ventured to bathe came out with a thin coating of sulphur on many parts of their body and emitting so strong an odor that we were forced to quarantine them for some hours.

ED FITZGERALD.

LOFTY LAKES OF THE WORLD.

The most loftily situated lakes are found among the Himalaya Mountains in Thibet. Their altitudes do not, however, seem to have been accurately gauged, for different authorities give widely different figures regarding them. According to some, Lake Manasurovara, one of the sacred lakes of Thibet, is between 19,000 and 20,000 feet above the level of the sea, and if this is so it is undoubtedly the loftiest lake in the world. Two other Thibetan lakes, those of Cholamoo and Surakol, are stated to be 17,000 and 15,400 feet in altitude respectively. For a long time it was supposed that Lake Titicaca, in South America, was the loftiest in the world. It covers about 4,500 square miles, and is 924 feet above the sea. In spite of inexactitude with regard to the measurements of the elevation of the Thibetan lakes, they are, no doubt, considerably higher than this and any others.—*New York Telegram.*

THE WATER STILL RISES.

QUEER PRANKS OF A LAKE AS AN EFFECT OF AN EARTHQUAKE SHOCK.

NEW YORK, September 18.—To-day's *Herald* has these cable dispatches:

"SAN SALVADOR, VIA GALVESTON, TEX., September 12, 1891.—The waters in Llapango Cojutepeque, or Illabasco Lake, as it is variously known, keep on rising. The workmen sent by the government to open an outlet to the ocean are still hard at work.

"The shocks continue to be felt at irregular intervals. The earthquake of September 8 was experienced all over the country. The material losses are estimated at $500,000, although this seems a low figure.

"News was received here this morning from Guatemala City that ex-vice-President Dr. Rafeel Aola had been accidentally shot and killed while attempting to separate two of his friends who were engaged in a quarrel."

In the extreme eastern edge of Arizona there is a great shallow salt lake in a bowl-like depression, the sink itself being some hundreds of feet deep and three miles across. The basin, all the portion of it not taken up by the lake, is dazzling white with millions upon millions of salt crystals. In the center of the lake rises what appears to be a cone-shaped volcanic peak. Should you take the trouble to ford the lake you will find a miniature lake in the middle of the peak clear as crystal.

THE DEEPEST LAKE KNOWN.

By far the deepest lake in the world is Lake Baikal, in Siberia, which is in every way comparable to the great Canadian lakes as regards size; for, while its area of over 9,000 square miles makes it about equal to Lake Erie in superficial extent, its enormous depth of between 4,000 and 4,500 feet makes the volume of its waters almost equal to that of Lake Superior. Although its surface is 1,350 feet above the sea level, its bottom is nearly 3,000 feet below it. The Caspian Lake, or Sea, as it is usually called, has a depth in its southern basin of over 3,000 feet. Lake Maggiore is 2,800 feet deep, Lake Como nearly 2,000 feet, and Lagodi-Garda, another Italian lake, has a depth in certain places of 1,900 feet. Lake Constance is over 1,000 feet deep, and Huron and Michigan reach depths of 900 and 1,000 feet.

Blowout Mountains in the cascades above Breitenbush, Ore., is unmistakably one of the wonders of the cascades, consisting of about eight hundred acres of granite rock piled up in every conceivable shape. From all indications it

has been caused by an accumulation of gas below, which bursting out threw the rock into the cañon, forming a beautiful lake from twenty to thirty rods wide and half a mile long, in which abound myriads of trout.

A peculiar fish, of brown color, without scales, and weighing twenty-one pounds, was caught in a net at New Dorp, Staten Island, this week, by the lighthouse keeper. In forty years' fishing the keeper has never seen a similar fish.

A MAMMOTH SPRING.

The largest and most wonderful spring of fresh water in the world is on the gulf coast of Florida in Hernando County. The Wekowechee River, a stream large enough to float a small steamer, is made entirely of water spouted from this gigantic natural well, which is 60 feet in diameter and about 70 or 80 feet deep. Chemists who have analyzed the water say that there is not a trace of organic matter in its composition, and that it is the most pure and fresh of any spring in America. A dime tossed into the spring can be seen lying on the bottom as plainly as it could in a glass of common well water. The steamer which makes regular excursion trips up and down the Wekowechee is often floated into the cavity of the spring, but cannot be made to stay in the center, as the force of the rising water forces it to the sides of the basin. The spring and 2,000 acres of land adjoining belong to two Chicago capitalists, who are making it a pleasure resort.

THE WORLD'S LARGEST SPRING.

At Mammoth Spring, Ark., and under the shadow of the Ozark Mountains, is the largest spring in the world. The water comes up in such a body that it forms a lake about the orifice. The output of the spring is 29,600,000 gallons daily. Records have been kept of it for ten years, and during that time the output has not varied 100 gallons a day nor the temperature a single degree. Winter and summer the spring remains at 59 degrees. The spring is evidently the outlet of some underground river.

The Poncho springs in Colorado are all on the side of a mountain, and hot and cold water flows from the ground in places not more than three inches apart.

FRESH WATER FROM A SALT BAY.

From the Florida Times-Union and Citizen.

BELLEAIR, March 3.—The Eldridge spring is quite an attraction to the visitors; it furnishes drink water for the hotel. It is out in the bay, but is cemented up, so as to keep out the salt water, and throws up 100,000 gallons of water per day.

A species of eyeless fish has been found in a subterranean boiling spring discovered in a Nevada mine.

The motion of the earth around the sun is 68,305 miles an hour; over 1,000 miles a minute, or nineteen miles a second.

A STRANGE POND.

Hicks Pond, in Palmyra, Me., is a strange body of water. It is only twelve acres in area, but it is more than 100 feet in depth. It has no visible inlet, although a fair sized stream flows from it into Lake Sebasticook. The volume of its waters is not materially affected by either drouth or freshet, and the water is always cold.—*Philadelphia Ledger.*

WONDERS BENEATH THE SURFACE.

Workmen engaged in sinking an artesian well in Sandy Valley, near Niria, N. M., struck an open seam, from which a cold stream of air rushed with force enough to remove a 12-pound rock laid over the opening. The air was charged with millions of small yellow bugs, each having but two legs, no wings and a small red circle on his back. They lived but a few seconds after striking the warm outside air. Local scientists are puzzling over the question: How did they get so far down into the earth?—*St. Louis Republic.*

FISH IN AN OLD WELL.

Some queer fish were taken out of the recently reopened well on the United States fish station at San Marcos, Texas, says the Louisville *Courier-Journal*. There were several salamanders, varying in length from an inch and a half to four and a half inches. These creatures live on land or water, have human-

looking faces, hands and feet, bulldog head, tail of an eel and body of fish. There were also large numbers of shrimps, resembling sea shrimps, only much smaller. It is an artesian well, and everybody wants to know where the creatures come from.

A wonderful artesian well is in flourishing activity at Huron, N. D. It throws a stream 100 feet high, and the flow is estimated at from 8,000 to 10,000 gallons a minute.

ST. WINIFRED'S WELL.

One of the most copious springs in Great Britain is the famed St. Winifred's well, near the town of Holywell, in Flintshire. The well is an oblong square, about twelve feet by seven, and its water, say the people of the district, has never been known to freeze. This latter assertion may be true, as besides containing a fair percentage of mineral matter that lowers its freezing point, the well is inside a beautiful chapel, which was erected over it by Queen Margaret, the mother of Henry VII. The water thrown up is not less than eighty-four hogsheads every minute, and the quantity appears to vary very little either in drouth or after the heaviest rain, showing doubtless that its primitive sources are numerous and widely distributed. Sir Winifred's has been the object of many pilgrimages.

MONTEZUMA'S WELL.

One of the most pleasing natural curiosities in the Territory of Arizona is the pool of water known as Montezuma's well. It is situated fifteen miles northeast of the old abandoned military post known as Cape Verde. It is 25 feet in diameter, and the clear, pure water is about sixty feet below the surface of the surrounding country. Some years ago certain military officers sounded the pool and found that it had a uniform depth of eighty feet of water, except in one place, apparently about six feet square, where the sounding line went down about 500 feet without touching bottom.

The well empties into Beaver Creek, only about 100 yards distant, the water gushing forth from the rocks as though it were under great pressure. The well is undoubtedly supplied from subterranean sources, possibly through the hole sounded by the army officers years ago. The sides of the well are honeycombed with caves and tunnels, permitting sightseers to descend to the

water's edge.

Montezuma's well contains no fish. The flow of water from it is the same throughout the season. Popular opinion has attributed the origin of the well to volcanic action, but as the rock surrounding it is limestone, it is more than probable that the action of the water is responsible for its creation.—*Native American.*

A REMARKABLE ISLAND.

From the Pittsburg Dispatch.

A rim of land inclosing a fresh-water lake in the middle of the Pacific Ocean is a novelty in the way of islands. There may not be more than one such in the great ocean, and, at any rate, that type of island is extremely rare. This strange spot is Niuafou, which is quite apart from other ocean islands. It lies midway between the Fiji and Samoa groups, and is under the government of the Tonga group, though it is 200 miles from these islands.

It has recently been visited by Lieutenant Somerville, of the British Navy. Some time or other a volcanic vent opened at the bottom of the ocean, and the lava that poured out of it piled up higher and higher, until it finally overtopped the sea. A great volcanic mountain had been formed, and the part of it that came into view above the waste of waters was, of course, an island. As time went on this volcano was the scene of one of those tremendous explosions that sometimes tear mountains to pieces. It was such a cataclysm that blew off the upper 3,000 feet of Krakatoa some years ago.

The explosion at Niuafou had a remarkable result. The interior of the crater was blown out to a considerable depth, leaving only the narrow rim, in this case a nearly perfect ring, around the deep central cavity. Such is the island of to-day.

A thousand Tongans live in the five villages that lie along the outer slope of that crater wall. The drainage from the inner slope has partly filled the cavity, forming a lake whose waters, though slightly alkaline, are drinkable. From the top of the crater rim one looks down upon the peaceful lake within, with its three little islands and the curiously shaped peninsula jutting out into it; and outside the rim is the ever-restless ocean.

WHERE THE VALLEY WAS A HILL IS.

From the Chicago Record.

SEATTLE, Wash., April 6.—A tremendous upheaval, accompanied by wonderful changes, occurred in the Mount Baker district March 27. What had once been a valley and the bed of a river is now a hill seventy feet high. The noise of the upheaval was heard at Hamilton, ten miles away. A report of the occurrence was brought to the city by D. P. Simons, Jr.

Simons says the noise of the upheaval sounded like heavy thunder. He and his party, who were examining timber lands, journeyed in the direction from which the sound came, and were astonished to see a huge mound of earth, nearly a quarter of a mile square, where formerly there had been a valley. In places the mound was seventy feet high. The Nooksachk River had been turned from its course, and ran around one side of a hill. Nearly in the center of this high bank of earth was a large lake. A forest had formerly occupied the ground, and trees which had escaped destruction rose above the water. There were cracks here and there in the mound large enough to ingulf a horse and wagon. There was a smell of sulphur in the air, and it is Mr. Simons's impression that the disturbance was caused by gases underneath the mountain.

William Hadley, a trapper, whose wrecked cabin now stands in the center of the huge mound, was absent at the time of the upheaval, and thus escaped death. His cabin was split in two.

REMARKABLE GEOLOGICAL DISCOVERY.

According to a Florida paper a remarkable geological discovery has been made there. The *Galena Advocate* says: "As P. M. Oliver, in company with a lot of friends, was chasing a fox through his field near Payne's prairie Saturday night last his horse ran into a sink and in getting the animal out Sunday morning attention was attracted to the numerous curious petrological formations on the sides of the sink. Further examination Monday disclosed immense beds of the petrified bones of the now extinct dinotherium giganteum, icthyosaurus, glyptodon, cuvieri, plesiosaurus, and peterodactyl. This is probably the richest find in the world and was altogether accidental."

TUNNELLING FOR WATER.

FOLKS OUT IN IDAHO WHO RUN THEIR WELLS INTO A SIDE HILL.

The citizens of Sweet, Canyon County, Idaho, have a novel way of obtaining water for domestic and irrigation purposes. The water is dug out of the hillside, with wells run like tunnels, and not down into the earth as ordinary wells are dug. East of the town, there is a bluff out of which sparkling mountain water can be procured almost anywhere by merely running a tunnel in from twenty to forty feet.

At one point in town, a stream sufficient to irrigate a fine orchard and garden, besides an ample supply for domestic use and for watering all the teams that pass that way, comes pouring out of the 40-foot tunnel. Neither the spring freshets nor the summer drouths affect its flow.

DOMINICA'S BOILING LAKE.

A NATURAL CURIOSITY THAT WAS NOT DISCOVERED TILL 1875.

Mr. Sterns-Fadelle of Dominica has just published a little book giving some interesting information recently obtained about a curious natural phenomenon in Dominica, one of the Lesser Antilles.

This island is only 291 square miles in area. It was colonized by the Spaniards in the seventeenth century and peopled later by French emigrants, who controlled the island uninterruptedly until the eighteenth century, and its resources have since been exploited by English and French; and yet its natural curiosity in the northern part of the island had never been seen or heard of until twenty-eight years ago.

This can be explained only by the fact that the neighborhood of the boiling Lake of Dominica is difficult of access. The lake was discovered by an Englishman, Dr. Nichols, who organized an expedition to explore the unknown part of the island.

One day his little party were clambering up a mountain. They suddenly came upon evidences of sulphur, and a moment later stood looking down into a crater which was filled with boiling water.

Stifling vapors rose from the agitated surface, rumblings of thunder came from the subterranean regions, and near the center of the little lake, where the water was most violently disturbed, the furious boiling lifted the surface ten or twelve feet above the general level. The lake was constantly fed by several small brooks that poured from the heights above the crater.

Mr. Sterns-Fadelle says that the lake is still boiling. It has been found to be at an altitude of 2,490 meters above sea level. In form it is elliptical.

When it is filled with water it is about 200 feet long and less than 100 feet wide. Its depth is unknown. An attempt to touch bottom was made thirty feet from the water edge, where, at a depth of 195 feet, no bottom was reported.

The water is not always in movement. At certain times the surface is calm and glistens brilliantly under the rays of the sun.

At other times it is violently agitated and boils away, exactly like a big tea kettle. But, instead of the singing that accompanies the ebullitions in the kettle, the boiling fluid in this cauldron is accompanied by the gruffest and most unpleasant detonations. Little waves roll up on the narrow shelf of sandy beach, which is covered with a scum of sulphur.

The boiling lake is the center of the present volcanic activity of Grande Souffrière, or Diabolin, a mountain covering an area of about five square miles. The lake is one of the last vestiges of volcanic energy left to the big mountain, which within the historical period has had no great outbursts.

LAKE CICOTT'S SEVEN-YEAR RISE.

INDIANA PHENOMENON REAPPEARS ON SCHEDULE TIME.

INDIANAPOLIS, Aug. 1.—With neither outlet nor inlet that is at any time visible, Lake Cicott, a small body of water in Cass County, has now reached a height which it attains every seven years, and hundreds of acres of fine corn land are covered by several feet of water. The rural mail route, which runs along the lake's banks, has been abandoned by the carrier, for the water covers it to a depth of three feet and stretches beyond for several hundred yards.

Lake Cicott has been an interesting phenomenon to the people of northern Indiana for many years, but the secret of its rise and fall has never been

discovered. It is the only Lake in Cass County and is about one mile wide and about one mile long. The water is clear and cold and perfectly fresh. Its most mysterious characteristic is the fact that it overflows its banks every seventh year. The farmers who own the land upon its banks have become so used to this that they never attempt to cultivate the land in the seventh year, but give it up without protest, as they know it is sure to be claimed by the waters.

The Pottawattomie Indians who inhabited what is now Cass and adjoining counties were familiar with the characteristic of the lake. They believed that its bottom was inhabited by a powerful spirit, which at intervals of seven years caused the lake to overflow. They construed this action as approval of the tribe by the spirit, and watched anxiously for the time to come, for they saw in the rising waters a sure indication that they had done nothing to displease it. The early white settlers became acquainted with the legend and the oldest inhabitant is not able to recall a time that the overflow did not take place when expected.

The water has now reached its highest point, and will soon begin to recede and continue to do so till the old confines are reached. Residents of the locality say that the weather conditions have no effect upon the lake, for its rise in the seventh year takes place regardless of the fact of rain or drouth. Amos Jordan, a veteran of the civil war, who lives on a bluff overlooking the lake, says the only apparent difference between wet and dry seasons when the rise occurs is that the water appears to be colder in time of drouth. What is true of the rise of the waters is also true of their recession, for they gradually disappear regardless of the amount of rainfall in the county.

The phenomenon is explained on the theory that there is a subterranean outlet, which becomes closed in some way and is opened by the pressure of the water when the highest point is reached every seventh year; but this is mere guesswork and nothing has ever been discovered to justify such a theory. The Pennsylvania Railroad Company, which owns a number of ice-houses on the edge of the lake, made soundings at different places before the rise began, and found the greatest depth to be ninety feet.

Hundreds more of such clippings have been preserved in a scrap book describing similar phenomena all over the Earth, all of which seem solvable through claims herein set forth, in the combined influences of frictional and volcanic heat, and the occasional contact with outpouring streams from the

internal ocean of fresh water.

THE END.